OLOGY DEPT.

Gas Journal

Vol 267. 103rd Year. LONDON, AUGUST 8. 1951. No. 4601. Price 1/-

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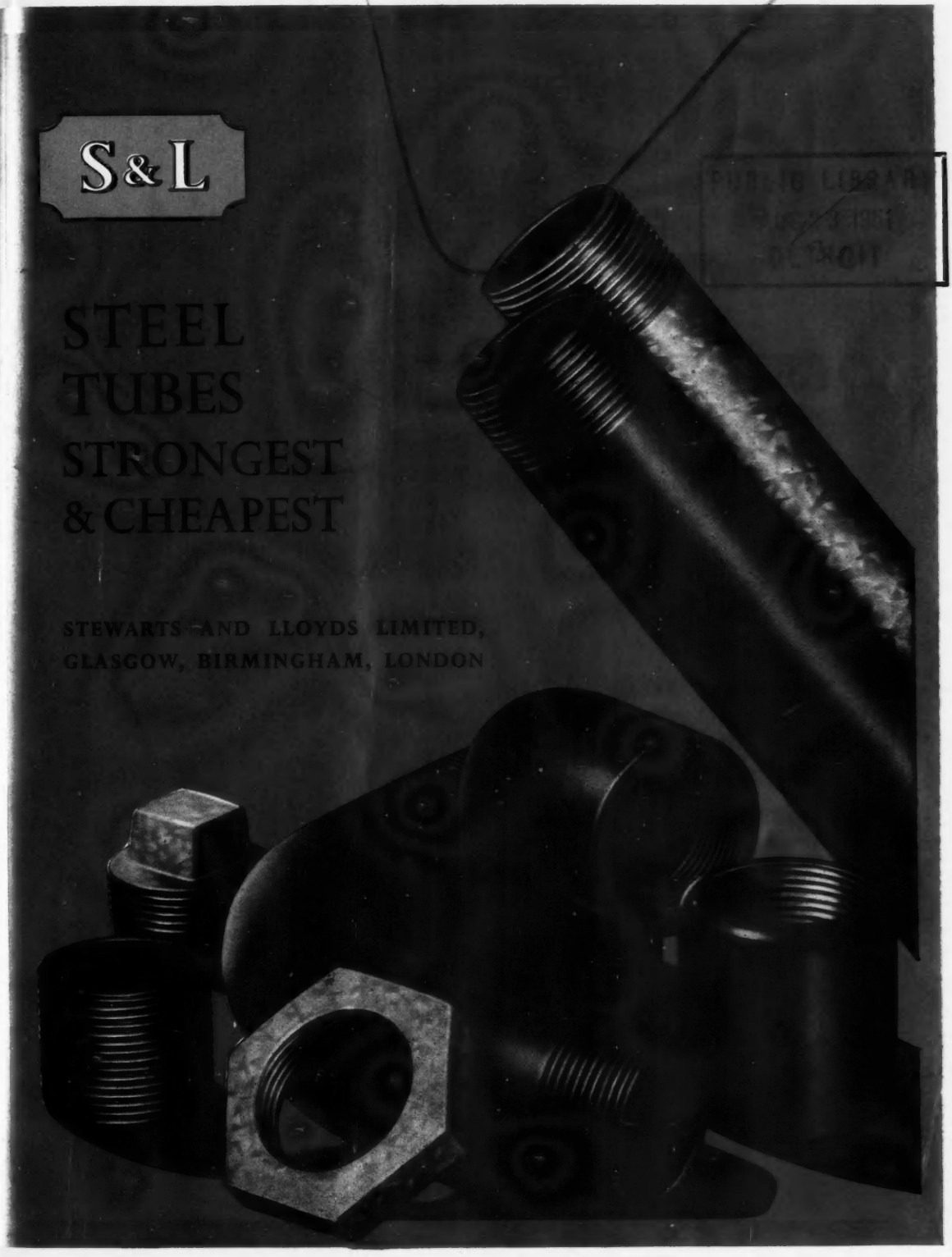

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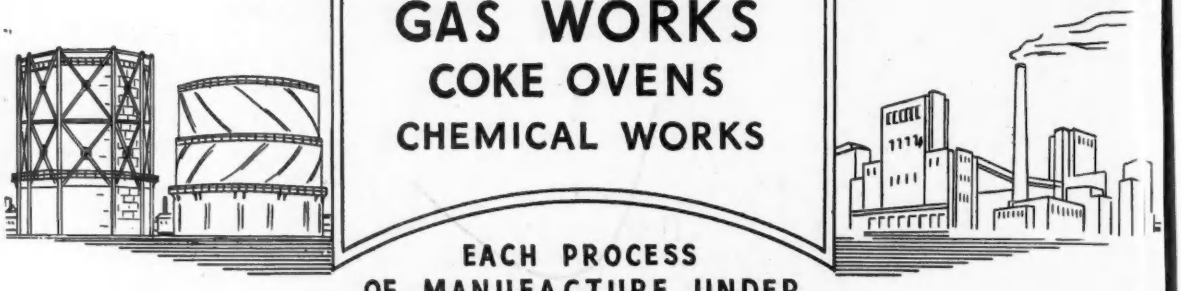

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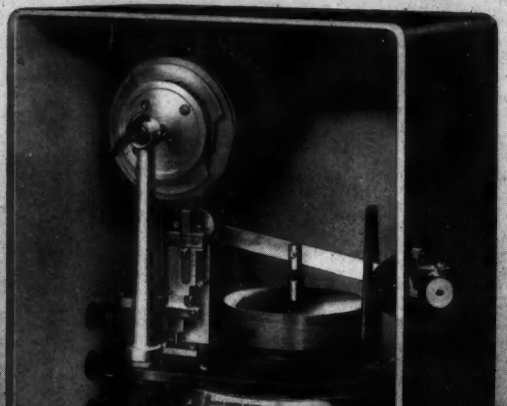

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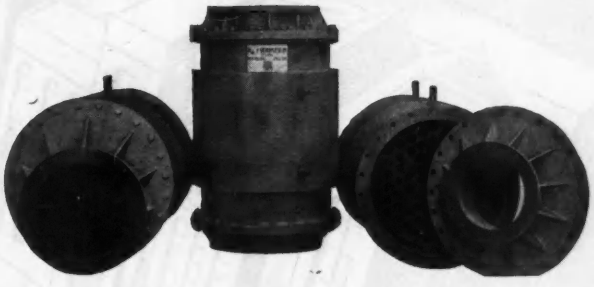

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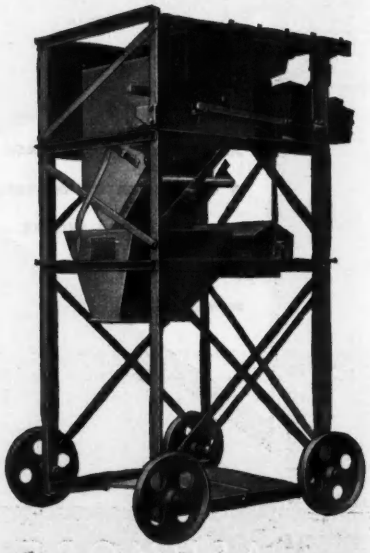

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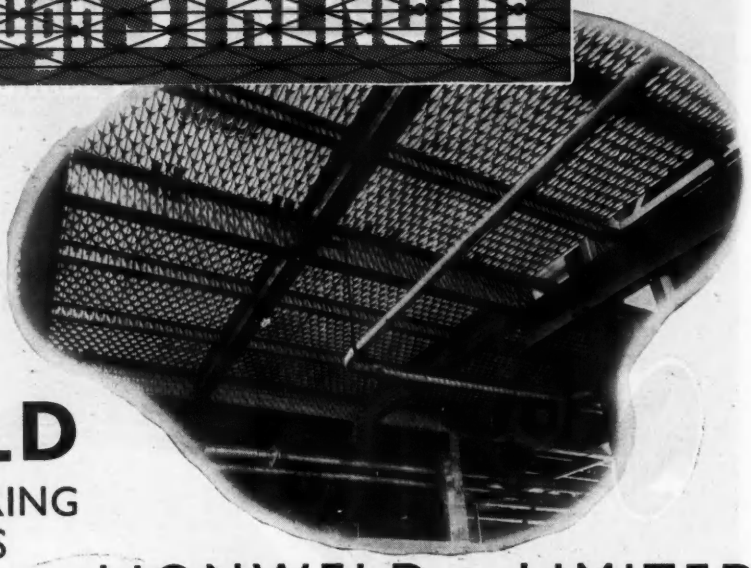
"and the strength is in the weld"



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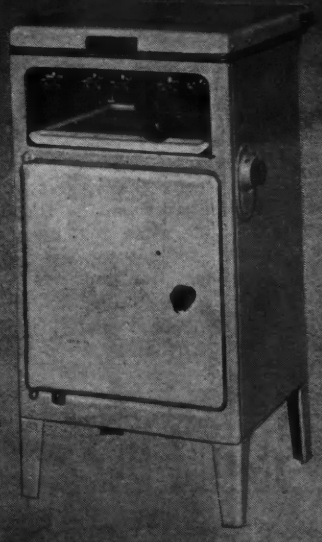

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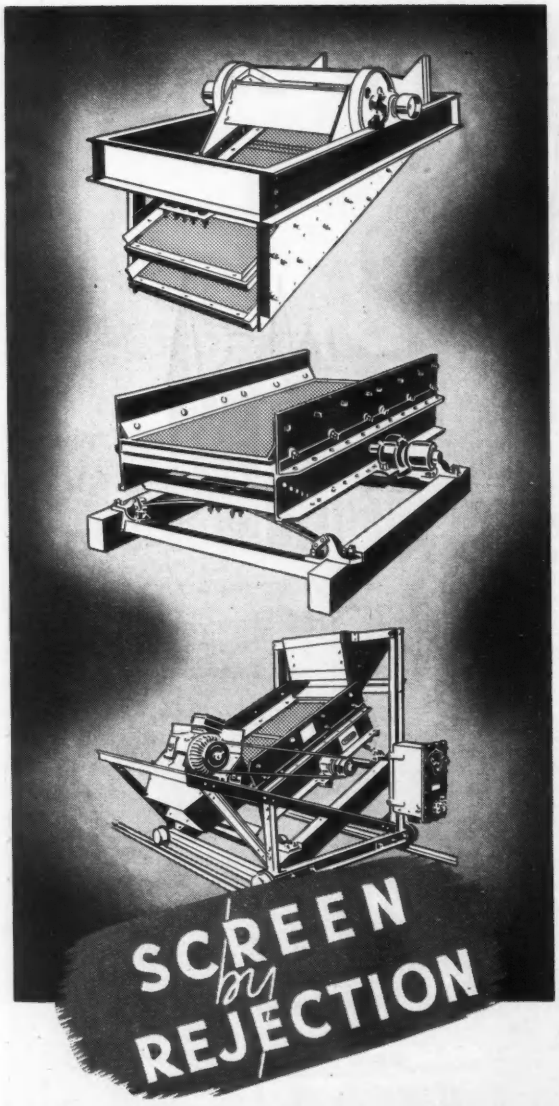

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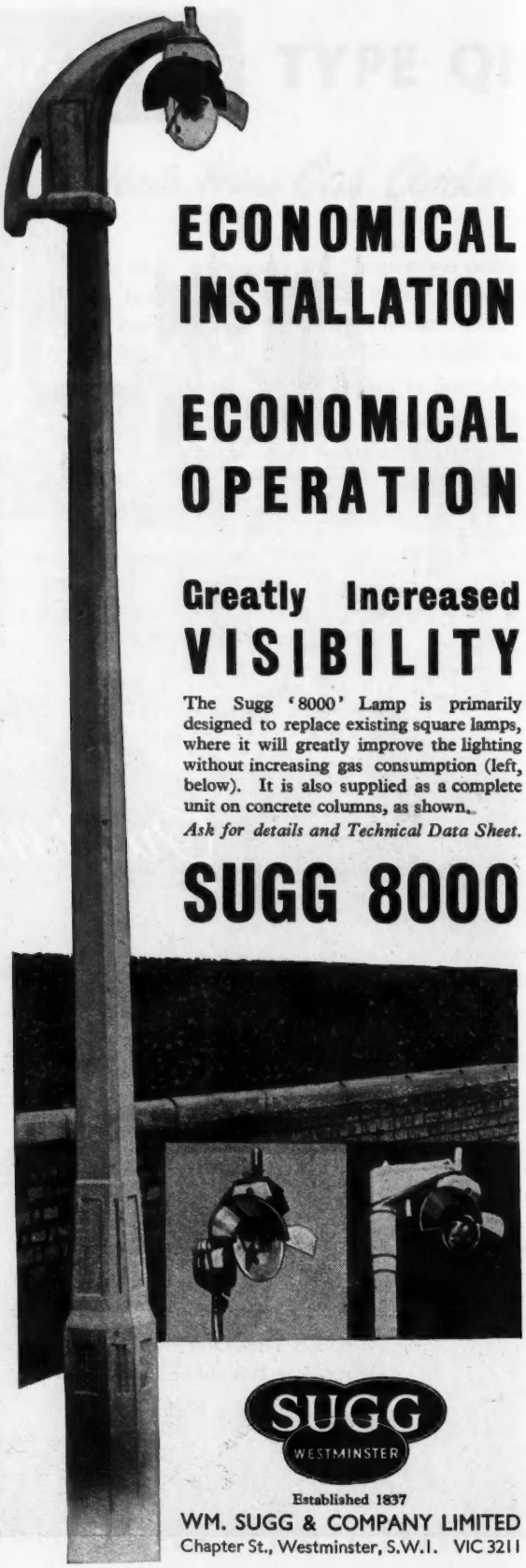

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Greatly Increased VISIBILITY

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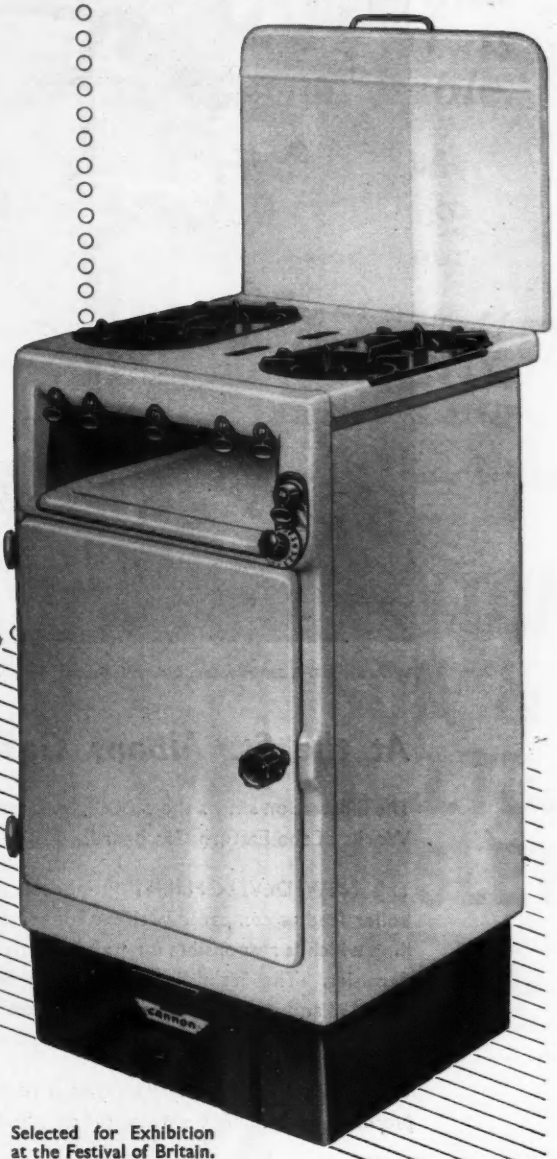

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...a cooker by

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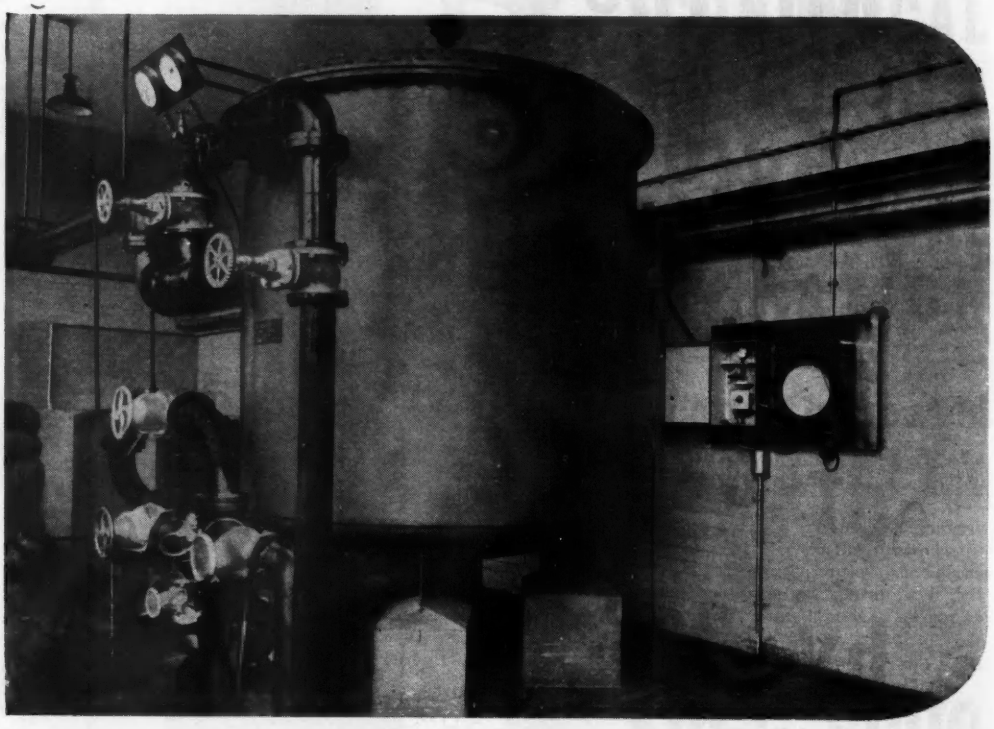
SOFTENING PLANT for Boiler Feed-Water



By courtesy of T. C. Battersby, Esq., Divisional General Manager, Watford Division, Eastern Gas Board.

At the St. Albans Gas Works

The illustration shows the 5,000 g.p.h. installation, stabilising lime softened water, at the St. Albans Works of the Eastern Gas Board.

This NEW DEVELOPMENT in modern water softening practice offers greatly improved quality of boiler feed as compared with the conventional lime/soda process alone, since it eliminates the excess lime which is responsible for "after precipitation," and controls alkalinity, thus reducing boiler water densities. The Stabilising process has been developed by FILTRATORS (Pat. Nos. 576014 and 576019) and can be applied either to the modernisation of existing lime softening plant, or can be incorporated in complete new installations using modern accelerated reaction technique.

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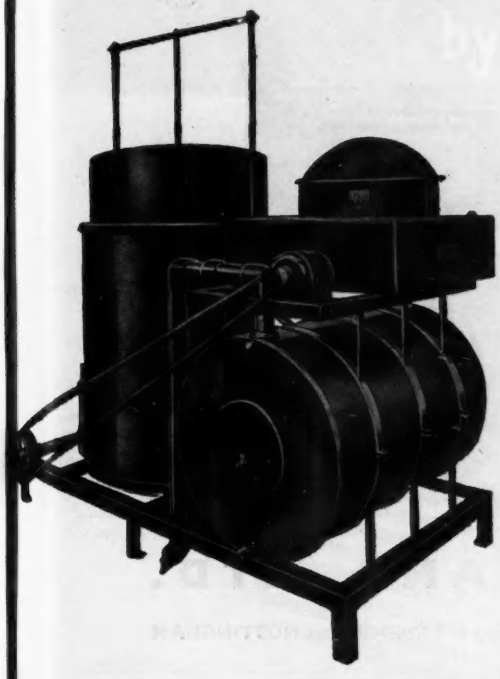

Suitable for Domestic, Commercial and Industrial Appliances at Home or Abroad where Town's Gas is not readily available.

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"A G S" Gas Meters

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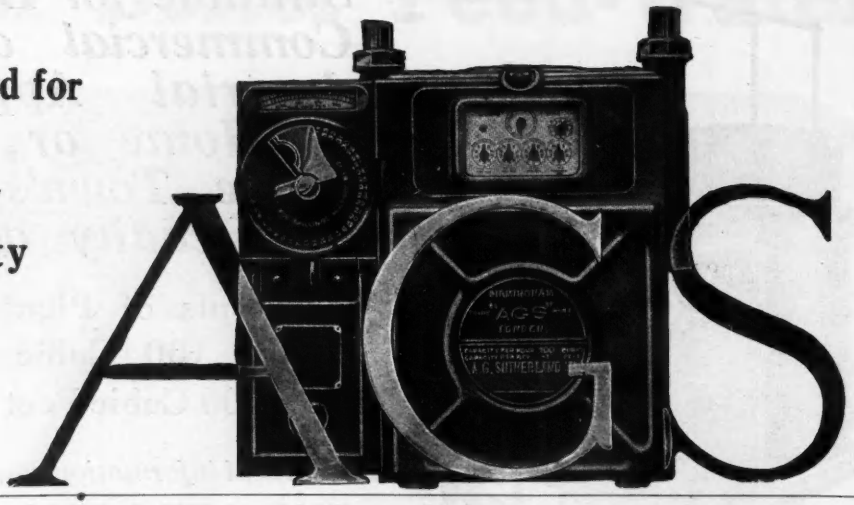

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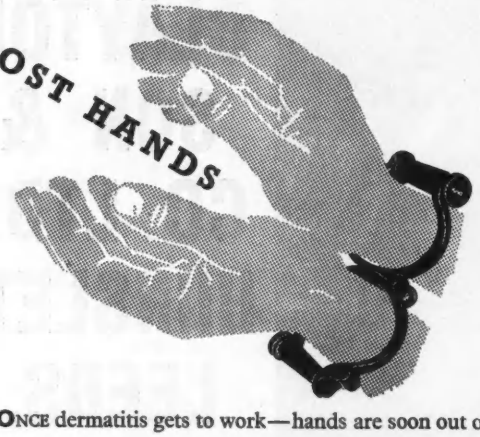

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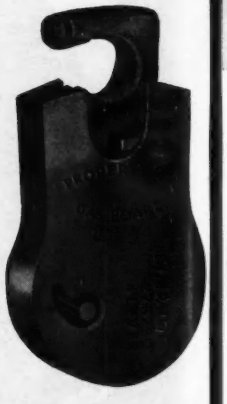

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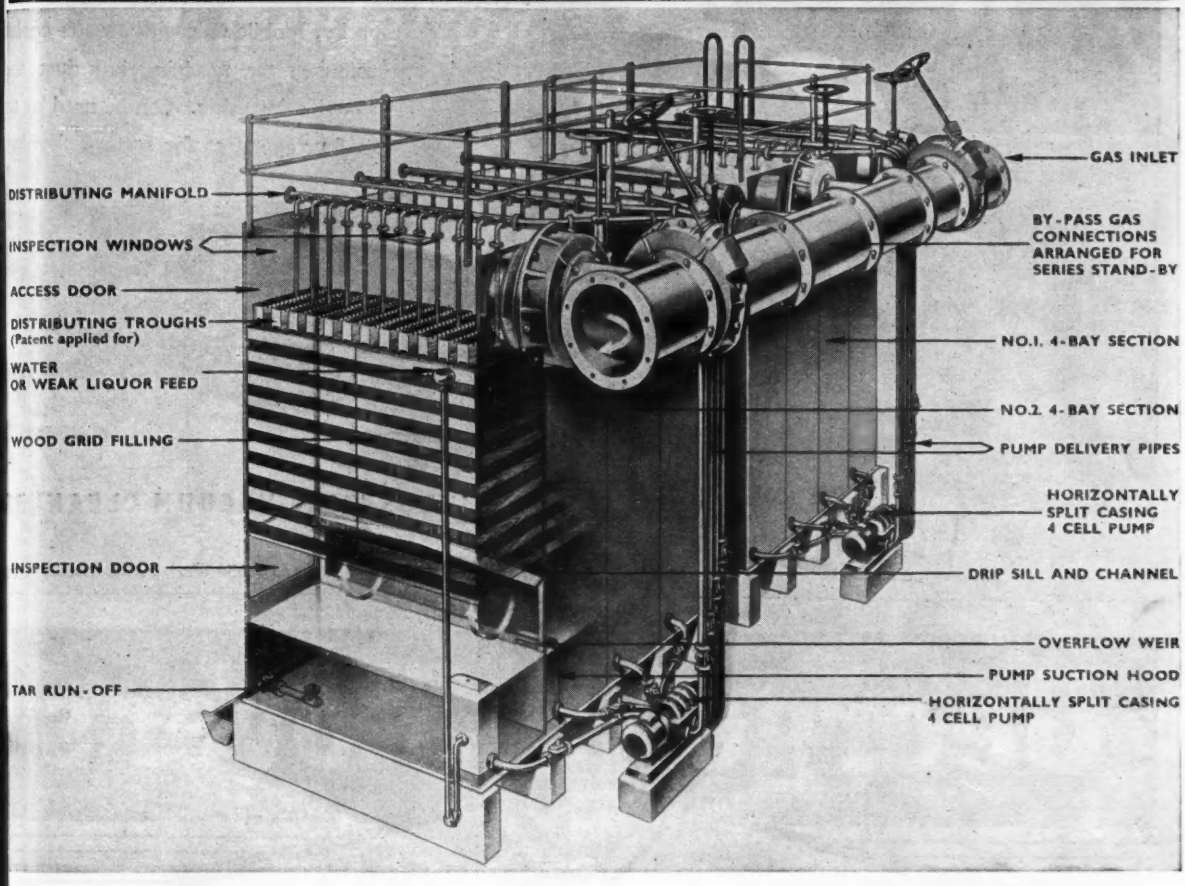

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Model T.87 has been specially designed to be of maximum service in gas works. It is a highly efficient, large capacity, mobile unit with a water cooled container for receiving hot dust and smouldering ashes. Can be used by up to four operators for surface cleaning.

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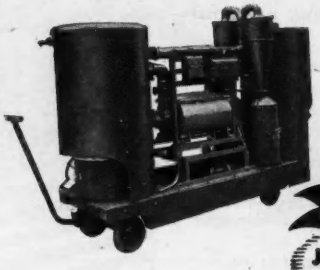

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The British Vacuum Cleaner & Engineering Co. Ltd., Dept 63 Goblin Works, Leatherhead, Surrey

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Dependable Year-in Year-out

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1/- Single Coin

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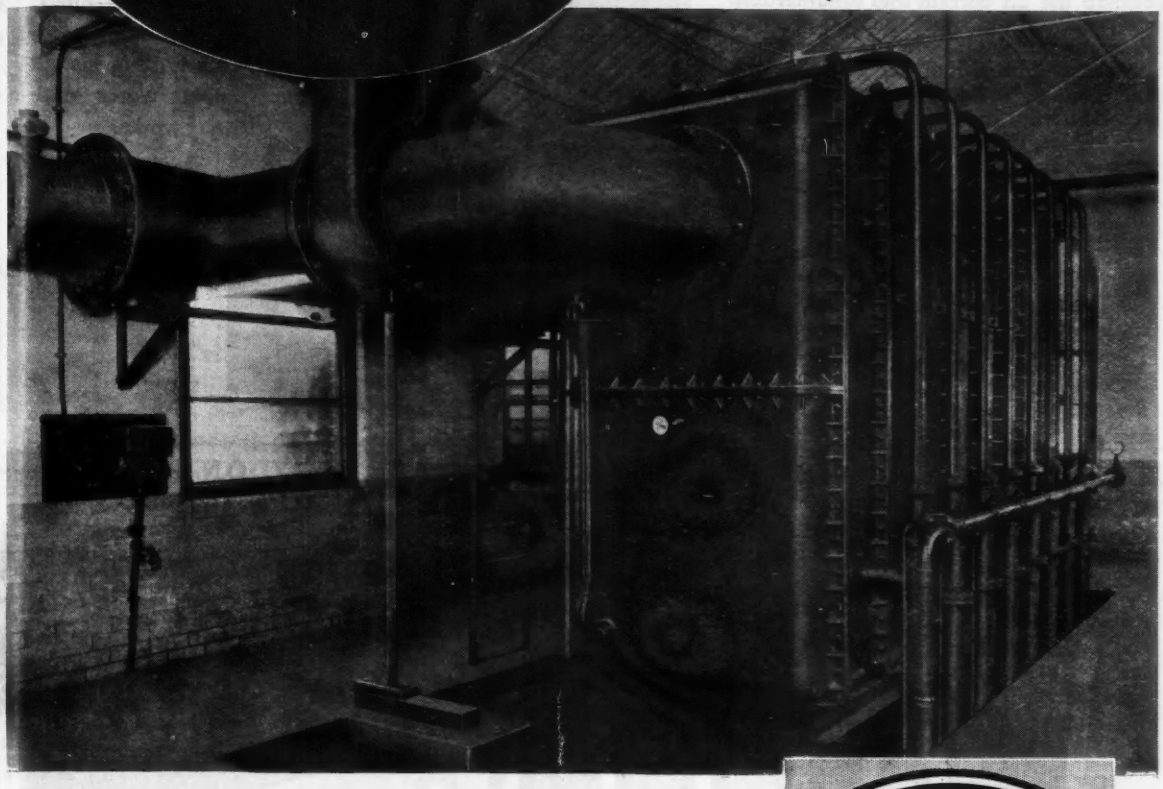
Gas Lift Circulation

WILTON STATIC WASHER Solves a Problem



With the use of compressed gas to effect irrigation, the Wilton Static Washer effectively deals with the source of considerable trouble. Corrosion is minimised, as there are no moving parts in contact with the scrubbing medium. The gas compressor can be situated any distance from the washer, and all parts are easily accessible.
Note the general neatness of installation resulting from the compact design.

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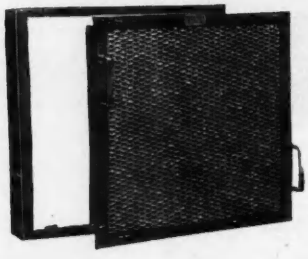
ROTATING SELF-CLEANING TYPE

for very Dusty Situations

Where the air is heavily laden with dust — collieries — steel works, gas works—our Patent Rotating Self-Cleaning type is best. This type is installed in many steel works and gas works.

Just how good "Visco" Air Filters are is shown by their extensive use in countries subject to dust and sand storms, such as Egypt, India and Iraq.



There is a "Visco" Filter to meet every air filtration problem. Send us your enquiries Write for list.

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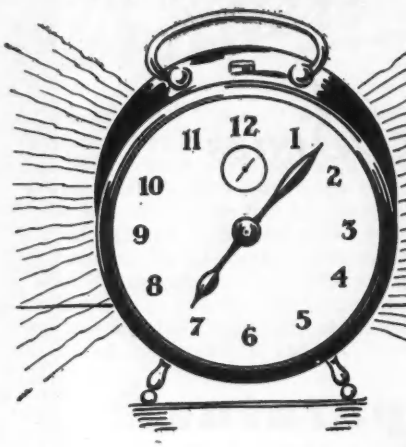

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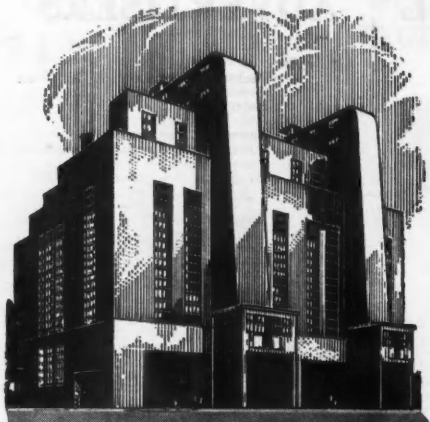

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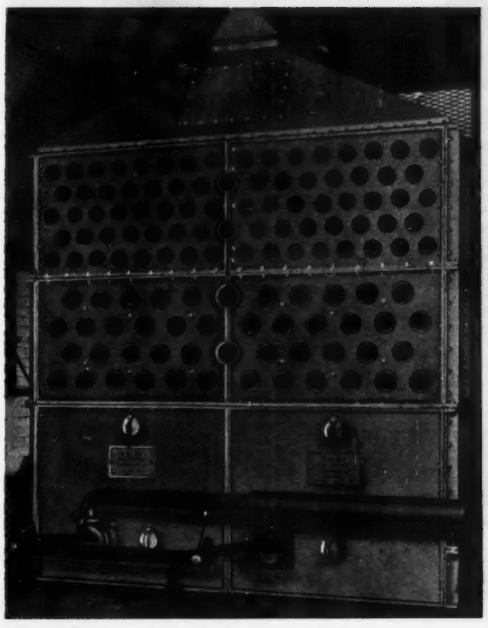

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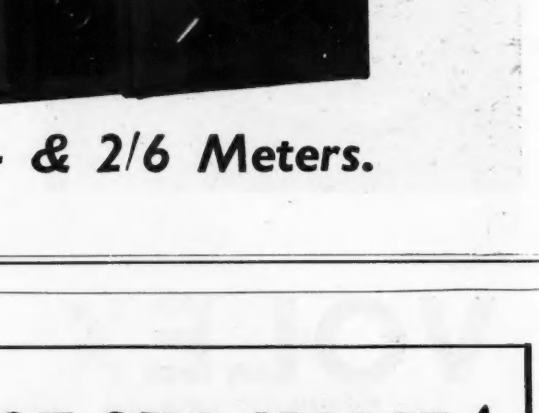

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GAS JOURNAL

VOL. 267. No. 4601 103RD YEAR AUGUST 8, 1951

GAS COOLING AND WASHING

EXCEPT where gasworks are situated on a large river estuary the rising cost and increasing demands on cooling water are compelling a reconsideration of many industrial cooling and washing problems. It is becoming as necessary to avoid wasting water, and particularly potable water, as it is to avoid wasting heat. And the two forms of waste are to some extent allied. That these problems have been for some time engaging the attention of technicians in the gas industry is evidenced by the number of references mentioned by Mr. J. B. McKean in his excellent paper on gas cooling and washing plant (see pp. 347-354).

Crude gas leaves the retort at a considerable temperature, the fairly rapid reduction of which is the first stage in the whole system of wet purification, properly so-called because even in this stage separation takes place of tars, light oils, and some of the solid substances such as naphthalene which they carry in solution. The very first stage of cooling takes place at the retort outlet where heat is dissipated and lost from top fittings and outlet pipes or where it may be retained in the gas by absorption in liquor sprays of one or other form. The interesting observation is made that though these sprays reduce the temperature of the gas they do not reduce its heat content. The sprays improve the amenities of the retort house (among other advantages) but they do not relieve the load on the condenser. They conserve heat—but can use be made of the heat so saved? In any case, heat carried away from the retort whether in the hot gas itself or in any accompanying undecomposed steam represents a loss to the process unless it can be recovered and used lower down the system, as for instance in boiler feed water.

Economy in water seems to become an important point when costs rise above 3d. per 1,000 gallons. At this point it begins to pay to increase the size of the cooling unit—economy in iron and steel is outweighed by cost of water. But costs in inland stations are often much higher than this; 10d. or 1s. is not uncommon and mention was made in the discussion of a case where 2s. 2d. and 1s. 8d. had to be paid per 1,000 gallons. In these cases the cooling tower or other means of conserving water would appear to be imperative. Mr. J. E. Davis thought the time had come to look again at the atmospheric condenser. The point was developed by Mr. E. B. Talbot, who suggested the use of forced draught to economise in size and space occupied. He could see no reason why, if the gas tubes were finned, such a cooler should take up much more room than the conventional water tube cooler. In some tropic and sub-tropic situations mechanical cooling, in some form, is operative because of the high temperature of any water available.

Gas cooling is complicated by the presence of soluble impurities in the condensates. Naphthalene is the most troublesome of these, but this trouble is matched by the general necessity to get all the tar away before the gas enters the oxide purifier. The introduction of the electro-detarrer has done much to clean up the purifiers. Its merits are now well known. It was interesting to learn that the power absorbed by this apparatus is generally only about half that required to overcome the back pressure thrown by the Livesey washer, while that thrown by the electro-detarrer is negligible. And yet this now old-fashioned piece of apparatus is shown to be quite effective if it is well maintained, apart from its usefulness in ammonia removal. The electro-detarrer has come to stay, but the questions of its position in the gas stream, though generally now stabilised after the exhauster, and whether (for the sake of the effluent) there is to be another one in the hot gas, have still to be finally settled. The full answer has not yet been found to the problem of tar compounds in oxide.

The discussion was nearly as interesting as the paper itself. Some of the points raised are referred to above. The little passage of arms between the author and Mr.

A. H. Savill about the possibilities of testing a gas cooler at the new East Kilbride station of the Department of Scientific and Industrial Research brought out the suggestion that it might be better to use research staff for investigations on the site. This is a technique of research which might well be developed further. Without going into detail here it may be recommended to the attention of the new Research Committee of the Gas Council. Investigation into the operation of plant *in situ* is certain to be more realistic than tests of types in the laboratories as well as to be vastly more educative to the staff employed.

Mr. McKean's remark that the turbo-exhauster effects some reduction in naphthalene fog, which we may extend to tar fog generally, reminds us of the impact method of eliminating tar fog and leads one to inquire whether anything practical has been contemplated in this direction.

The 'state of the art' in ammonia washing was well described and discussed. Water economy is limited by the necessity to keep outlet water temperature above 120°F. to avoid, among other things, corrosion due to oxygen liberation. We should like to know just what is the present position in this matter. It would appear to be not beyond the resources of modern metallurgy to produce an alloy which would resist corrosion under these not very exacting conditions. And finally we ask whether anyone has thought of using the copious volumes of ammonia as a refrigerant in gas cooling.

THE ENGINEER AND SOCIETY

IN a world which is a-tremble with the first waves of a second industrial revolution, there is a tendency to look upon the engineer with new eyes. He is regarded as something more than a mere mechanic. The advent of gas turbines, electronic and chemical advances, and the two-edged prospect of harnessing atomic power reveals the engineer as a sort of high priest of modern society, a man wielding power and capable of unleashing blessings and horrors with equal ease. This view is by no means universal but it is spreading; and at the hub of this widening body of opinion is, not surprisingly, the engineer himself. An example of what the engineer thinks other people ought to think of him was contained in a paper by the Chairman of the Scottish Branch of the Engineers' Guild, William Boyle, to various Guild audiences north of the Border. Mr. Boyle is nothing if not provocative (take, for example, his assertion that horse-power per head of population is the true index of living standard and civilisation), and we believe that several of his comments will interest those of our readers who take the engineering profession suitably seriously.

In the author's view, the engineer, although he is the architect of technical transformation and his activities have become more integrated with every aspect of advance, has not enjoyed that advance in professional stature which he deserves. Particularly is this so in Britain. It is ironical that this backward condition should exist in the pioneer land of engineer-based development, in glaring contrast to the position abroad, and to other professions even at home. Switzerland has found that registration of engineers—rather as doctors are registered in this country—results in the creation of a national technical core the excellence of which is universally admitted and continually rising. Nowhere in Europe is the status of the professional engineer so high as in this small country of limited natural resources.

The loose application of the word 'engineer' has roused Mr. Boyle's wrath. He maintains that for the public the term conjures up a factory worker in oily overalls, and 'many even regard it as applying only to members of a certain trade union.' In contrast Continental practice designates turners, fitters, and associated engineering craftsmen as 'mechanics' and employs the term 'engineer' for the highly trained man with recognised professional qualifications. The engineer 'rightfully resents being looked on as one to be hastily summoned by laymen in an emergency and summarily dismissed after supplying decisive information, being treated like the plumber in the kitchen rather than the colleague in the conference room. He is too often expected to be merely dumb, diligent, and disappear!' Equally the author disapproves of the description, given on exceptional occasions, as on some special discovery, as a 'back-room boy'—a sort of technical troglodite.

BROADER EDUCATION NEEDED

THE professionally conscious engineer can only correct the perspectives of others with respect to himself, by belonging to a 'pressure group', the essential means of asserting identity in this highly organised modern world. Mr. Boyle, believing that being articulate or adequately self-expressive outside his technical boundaries has not been, nor is yet, one of the engineer's strong points, sees the answer in a fuller education. Because the engineer is absorbed in pre-occupation with things and theories rather than people and atmosphere, the advisability of a wider curriculum in the engineer's academic training merits serious consideration. The inclusion of some branch or branches of the humanities might serve 'as a bulwark against the narrowing effect of technical specialisation.' By such means, suggests the author, the engineer will avoid the extremes illustrated by the scientist and the salesman: 'On the one hand that of the too pure specialist who begins by knowing much about little, and continues to know more and more about less and less, till he knows practically everything about nothing; or his opposite, who starts by knowing a little about many things, and goes on knowing less and less about more and more, till he knows practically nothing about everything.'

By acquiring a broader humanistic basis, the engineer can become more universal than the non-technical classicalist in the part. The conception that the scientist and artist are inevitably antithetical has, as Mr. Boyle says, acquired strong roots. The growing awareness of the interdependence of use and beauty is revealed by their integration in the formation of the Council of Industrial Design, etc.

It would be ungracious not to applaud this determined attempt to glorify the engineer and give him his deserts—and perhaps a little more. But to the gas industry some of these views may sound just a little high-faluting. *Does* the average gas engineer want to be recognised as 'the key figure in this technical epoch?' We think not: He wants, surely, to do his job as efficiently as possible, and if he is accused of having an excess of modesty, he will reply that that is just the sort of excess he prefers. Which may explain why although the Engineers' Guild, formed in 1938 and organised on similar lines to the British Medical Association, is supported by 'all chartered civil, mechanical, and electrical engineers', there is little evidence of representation of our own industry. Perhaps we are missing something. If the following words, which constituted the concluding paragraph of Mr. Boyle's paper, serve to fire our readers with a new enthusiasm, then perhaps the gas engineer may yet assume a new æsthetic and social stature. We quote without comment:

'Productivity in all spheres is spotlighted today, as the key to cultural advancement. Scarcity of manpower in relation to this need underlines the social importance of the engineer. The engineer will mould the future. With an artist's vision and thought as fleet as time, he can lead the race!'

NOT HELPFUL

THE public are being urged to lay in stocks of solid fuel during the summer in the hope of averting another fuel crisis next winter. What more natural, then, than the placing of a standing order with one's supplier to deliver fuel regularly throughout the summer months? What more irritating at a time when one is burning little or no coal or coke than to have to remember to order afresh every month? The gas industry is neither promoting goodwill nor best serving the interests of the consumer or the objects of 'stock-piling' if every board is following the procedure of the North Western in refusing to accept standing orders for coke. The consultative council for that area is in our opinion right in pressing for a reversion to former practice—and the Board's excuse that there is insufficient coke to meet the demand is no answer to the point at issue. If the full demand cannot be met standing orders can still be accepted and scaled down if necessary in relation to the supply position. Private distributors are prepared to operate on the basis of standing orders, and there is no valid reason why gas boards should not do the same.

Personal

Mr. J. W. Martin, Sales Manager of Whessoe, Ltd., Darlington, has been appointed a Director of the Company. He will continue to be located at the London office.

◇ ◇ ◇

Congratulations to Mr. J. H. Dyde, President of the Institution of Gas Engineers, and his son. Awarded his eleven quite late in the term, **J. A. Dyde** in his first appearance at Lords scored 50 for Rugby against Marlborough last Wednesday.

◇ ◇ ◇

Miss O. L. Humphries, new Chairman of the Women's Gas Federation, has been Vice-Chairman for the past two years, and has, since its inception in 1935, served on the National Executive of the Federation, and on many of its sub-committees. She was chief demonstrator to the former City of Birmingham Gas Department and is now area Home Service Adviser to the West Midlands Gas Board. Her father, the late Sir Herbert Humphreys, was Birmingham's City Engineer and Surveyor until his retirement in 1936. For nearly 20 years she has acted as organiser of the Women's Gas Circle which was formed in 1932 and which after the inauguration of the Women's Gas Council two years later became a branch, remaining the largest one in the country ever since. Miss Humphries' appointment marks a new departure as she is the first Chairman from the provinces and the first from the home service section of the gas industry.

◇ ◇ ◇

Mr. George W. Martin retired on July 28, having completed over 41 years at Houghton-le-Spring, the latter 30 years as Engineer and Manager of the gas undertaking. A native of Hull, he was articled with E. C. Jubb and Son, plumbers and hot water engineers, and attended the Hull Technical College. He then joined the British Gas Light Company, Hull, for a short period. Afterwards he was with the Richmonds Gas Stove Company, Warrington, and the Parkinson Stove Company, Birmingham, on contract work at various places in England and Wales before going to Houghton-le-Spring, Co. Durham, in 1910.

Obituary

As we go to press we learn with regret that **Mr. James Francis Davies,** former Chairman of Radiation Ltd., died suddenly on August 4 at his home, Priors, Little Aston Park Road, Streetly. The funeral takes place today (Wednesday).

◇ ◇ ◇

Mr. C. E. Parsons, who retired from the Leominster district of the West Midlands Gas Board in December, 1949, died on June 30, aged 69. Mr. Parsons had been Engineer, Manager, and Secretary at Leominster since 1918. Consequent upon the death of his father in 1899, he accepted responsibility at a very early age, being appointed resident Manager to the Atherstone Gas Light and Coke Company, on the day before his 17th birthday. Mr. Parsons leaves a widow and one son.

Diary

Aug. 30-Sept. 13.—Engineering, Marine, and Welding Exhibition, Olympia. (Gas Council exhibit).

Sept. 4.—East Midlands Gas Consultative Council: Victoria Station Hotel, Nottingham, 11.30 a.m.

Sept. 6.—North British Association of Gas Managers: Annual General Meeting, Ayr. (Golf and bowling functions, Sept. 5; Excursion, Sept. 7).

Sept. 7.—Manchester and District Section, I.G.E.: Visit to Newton Chambers & Co., Ltd., Thorncliffe.

Sept. 10.—West Midlands Gas Consultative Council: Dudley Room, Queen's Hotel, Birmingham, 2.30 p.m.

Sept. 11.—Irish Gas Association: Annual Meeting, Dublin.

Sept. 17.—Eastern Gas Consultative Council: Connaught Rooms, Great Queen Street, 2 p.m.

Sept. 18-21.—Association of Public Lighting Engineers: Annual General Meeting and Conference, Brighton.

Sept. 19.—South Western Gas Consultative Council: 34, Bridge Street, Taunton, 11 a.m.

Sept. 19.—Wales and Monmouthshire Section, Institution of Gas Engineers: Autumn Meeting, Llanelly.

Sept. 20.—Gas Council Commercial Managers' Committee: Edinburgh, 10 a.m.

Sept. 21.—Institution of Gas Engineers (North of England Section): 'Some Aspects of Gas Manufacture Practice in the North Thames Gas Board Area', Dr. J. Burns, G.M., Chief Engineer, North Thames Gas Board. Seaburn Hotel, Sunderland.

Sales and Service Conference

London, October 23 - 25

SALES and service personnel throughout the country will welcome this first general release of the provisional programme for what should prove a stimulating and enjoyable conference, the stage for which will be set in the Seymour Hall in the Borough of St. Marylebone. That side of the gas industry has suffered more than the supply side, for whom wartime and post-war difficulties meant a greater urge and a stronger demand on their skill and energies, the while sales organisations had to pipe down under sales truces, shortage of goods to sell, the incubus of purchase tax, and the time lag in reconstituting the Circles under nationalisation. True, the wood is still fairly dark and the way has to be cut through the tangle of rearmament and the prohibition of competitive publicity; but the Circles are at work again and the Gas Council is turning on the limelight for a bigger show than has ever been staged for Cinderella. The fairly godmother's name is Reginald Gregg.

Provision is being made for possibly 600 delegates at the conference, drawn from all branches of sales and service personnel together with a big contingent of home service advisers. The theme of the whole affair will be personal service to the public; and on the practical side the conference will be supplemented by an exhibition of domestic appliances for which space is being rapidly taken up by member firms of the S.B.G.I. and others. Each session of the conference will be presided over by one of the Area Board Chairmen. It is hoped that the papers presented, of which copies will be available in advance and which will only be summarised from the platform, will be contentious enough to provoke the widest general discussion.

The programme, of which some details have yet to be confirmed, is as follows:—

TUESDAY, OCTOBER 23.

Special assembly at Friends' Meeting House, Euston Road. H.R.H. the Duke of Gloucester will be received by the Mayor of St. Pancras and will open the conference. Official Reception by His Worship the Mayor. Sir Edgar Sylvester, K.B.E.—introductory address. Official Luncheon by the Mayor and Council of St. Marylebone.

3 p.m.—Business session, Seymour Hall. Theme—health of the community. Addresses by a member of the medical profession and by a member of the gas industry.

5 p.m.—Adjournment before Reception and Dance at invitation of the St. Marylebone Council at Seymour Hall.

WEDNESDAY, OCTOBER 24.

Morning.—Papers by Mr. F. S. Evans, S.E.G.B., on coke sales and by Mr. D. R. Griffiths, Director of the Incorporated Sales Managers' Association.

12 noon.—Official inspection of exhibition. Buffet lunch.

Afternoon.—Address by a representative of the S.B.G.I. Panel of experts will answer questions.

Address by Mrs. Eileen Murphy, supported by Miss Mary Strong, N.G.B., and Mrs. Mair Jones, S.E.G.B.

THURSDAY, OCTOBER 25.

Morning.—Address by Dame Vera Laughton Mathews.

Address on Films and Visual Aids, on which it is hoped the speaker will be Mr. F. L. Hoare, Chairman of the Association of Specialised Film Producers.

12.30 p.m.—Lunch, at which—

Colonel H. C. Smith will review the conference.

Announcement of inauguration of the Gas Council Cup and Replica.

Presentation of prizes awarded by *Gas Service* in the 1950 National Competition (see *Gas Service* for July, p. 294).

It is anticipated that these proceedings will end at about 2.30 p.m., after which it may be possible to convene a joint meeting of the chairmen and secretaries of the Circles while others may visit the Watson House exhibition.

Apprentices' Sports Meeting

THE summer sports meeting of the apprentices of Robert Dempster & Sons, Ltd., Elland, was held on July 6.

The early part of the evening was devoted to outdoor events, in which the majority of the apprentices enthusiastically participated. The latter part of the evening was spent at the bowling green and sports pavilion on less strenuous competitions in which the apprenticeship committee and works foremen competed with their juniors. The whole of the proceedings were watched with interest by a large company of the workpeople and parents.

Mr. Morton (Managing Director) presented prizes to successful contestants. In the course of his remarks he stressed that while the sports meeting was the first of its kind at Rosemount Ironworks, he anticipated it would be the precursor of many others on a more ambitious scale. He emphasised that the apprentices came under the personal supervision of himself and the executive, and it was the firm's concern that social welfare as well as technical and practical training should have a foremost place. Mr. Morton commended the apprentices on their enthusiasm, advising them to carry it over into the field of their daily work. The boy who played hard usually worked hard.

A special prize presented by the foremen to the most successful all-round contestant, was won by F. B. Garbett.

In conclusion, Mr. Morton thanked the apprenticeship committee, the foremen of the works departments, and the apprentices for their contributions to an outstandingly successful occasion. Two apprentices, F. B. Garbett and A. F. Marshall, proposed and seconded a vote of thanks to the management for the interest shown in their welfare and the pleasure the occasion had given.

Some of the apprentices who took part in the events, together with members of the Apprenticeship Committee.

Radiation Headquarters.—The head offices of Radiation Ltd., and Radiation Group Sales Ltd., have been removed from Birmingham to Radiation House, 7, Stratford Place, London, W.1. (Telephone: Mayfair 6462. Telegrams: Radicentre, Wesdo, London.) The change of address took effect from yesterday (August 7).

The Institution of Gas Engineers has published in 'grey book' form Communication No. 376/177, being the paper by S. V. Gardner on 'The Application of Pre-stressed Concrete to Structural and Building Work in the Gas Industry,' presented at the 16th Autumn Research Meeting last November. Copies are available at 2s. 6d. each, post free.

IN PARLIAMENT

Debate on Prices and Profits

DURING a lively debate on prices and profits, initiated by Mrs. B. Castle (Blackburn, East) in the Commons on July 27, references were made to gas, coal, coke and electricity.

Mr. C. Osborne (Louth) suggested that at the General Election the appeal to the electorate would be on the basis that prices were high because profits were high, and that if only profits could be cut prices would fall. Why could not this be applied to coal, gas, the railways and, above all, to coke? The basic trouble was largely the high cost of fuel, which came from the nationalised industries. 'If we could get back to cheaper motive power,' he added, 'our costs of production would come down very considerably.'

Alluding to price rings, he said the strongest in the country was that dealing with coal. The consumer could not go to another supplier, but had to take what was sent. 'One cannot complain of the quality,' he asserted, 'or of the price. If one does, one's supply is cut off. The same applies to gas and electricity.'

Mr. Michael Foot (Plymouth, Devonport) said there could be different reasons for high prices. The reason in the textile industry was different from that in the coal industry. It could not be claimed that the reason for the high price of coal was the profits made by the National Coal Board. But that did not mean that it could not be claimed, and proved, that one of the causes of high prices in the textile industry was high profits.

Mr. T. C. Pannell (Leeds, West) extolling the improvement in the lot of the agricultural worker under the Labour Government, referred to the criticism that the right to run their own electricity and gas undertakings had been taken from the municipalities, the industries nationalised, and put on a regional basis. 'I say that it was completely wrong for those industries to be run at cheap rates for townsmen, and the agricultural labourer to be ignored,' he declared.

The Parliamentary Secretary to the Board of Trade (Mr. H. Rhodes), replying to the debate, pointed out that the Chancellor of the Exchequer had already announced that the Government intended to reimpose a modified form of cost plus control on various articles, where appropriate. 'We recognise that prices are high,' he said, 'and our great anxiety is that they should be lowered in the shortest possible time.'

By-Products

Mr. J. D. Murray (Durham N.W.) asked the Minister of Fuel and Power on July 30 what steps he was taking, in conjunction with the National Coal Board and the Gas Council, to develop, manufacture, and market the by-products of coal; and if he would make a statement.

Mr. P. Noel-Baker replied that 'the National Coal Board and the area gas boards were large-scale producers of coal by-products, such as coke, coal tar, benzole, sulphuric acid, ammonia, etc.; with his active approval they were constantly expanding their capital investment in this work. For the details of their activities, he referred the questioner to the annual reports of the National Gas Board, the Gas Council, and area gas boards.'

Coal and Coke Difficulties

Complaints of shortages of coal in North Liverpool and East Anglia, and of coal and coke in West Sussex and Gloucestershire, for domestic users, were made in written questions.

The Minister of Fuel and Power, in reply, said he was making enquiries regarding the position in Liverpool, West Sussex and Gloucestershire, and would write to the Members concerned as soon as possible. Dealing with East Anglia, however, Mr. Noel-Baker pointed out that in the first 11 weeks of summer merchants in the Eastern region had already sold 22,355 tons more coal to domestic consumers this year than last. 'I trust that this additional coal is being stocked by householders against winter needs,' he added.

Officials' Powers of Entry

Mr. Douglas Jay, answering a question by Sir W. Smithers, regarding the total number of officials authorised to carry out inspections and investigations in business premises without a search warrant, said the figures for Government departments were 5,988 in the case of private houses, and 19,195 had powers to enter land, business premises, or private houses either used exclusively as such, or partly as business premises.

Coke Allocations

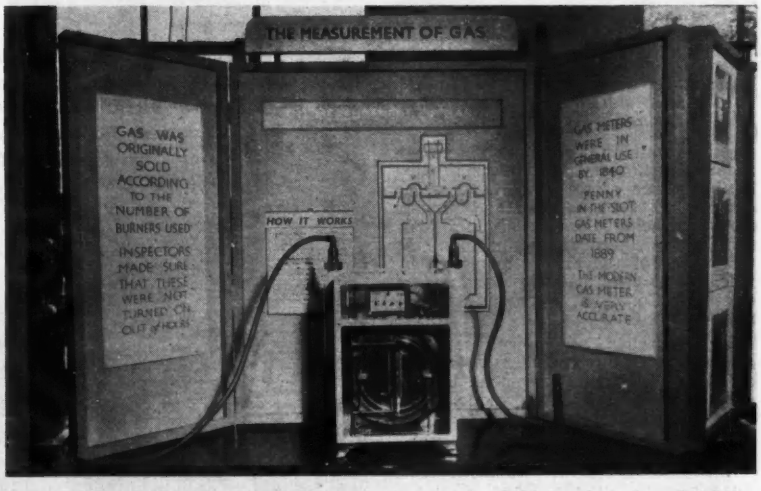
Mr. J. E. Powell asked the Minister of Fuel and Power on July 31 what percentages, region by region, of the allocation of coke for the first 12 weeks of the summer period were actually delivered to merchants within those weeks.

Mr. Noel-Baker said deliveries of gas coke in each gas board area in the first nine weeks of the summer represented the following percentages of allocations to all distributors: Scotland, 128; East Midlands, 103; Northern, 145; West Midlands, 117; North Western, 114; Wales, 103; North Eastern, 97; London, Eastern and Southern, 253. Deliveries of hard coke from supplying regions in the first 11 weeks of this summer represented the following percentages of total allocations (excluding blast furnaces): Scotland, 96; North Western, 95; Northern, 93; Midlands, 82; North Eastern, 90; South Wales, 89.

France : Compensation

Mr. Ernest Davies, for the Foreign Secretary, asked why there was a delay of five years in reaching agreement with the French Government for the payment of compensation to British owners of shares in nationalised French gas and electricity undertakings, and the total amount paid, said the negotiations were extremely complicated. The difficulties, however, were, in the main, overcome at the end of last year, and the agreement finally signed in Paris, on April 11, 1951. Complete figures of the sums paid in compensation were not available, since the closing date for declarations under the agreement had been extended to September 11.

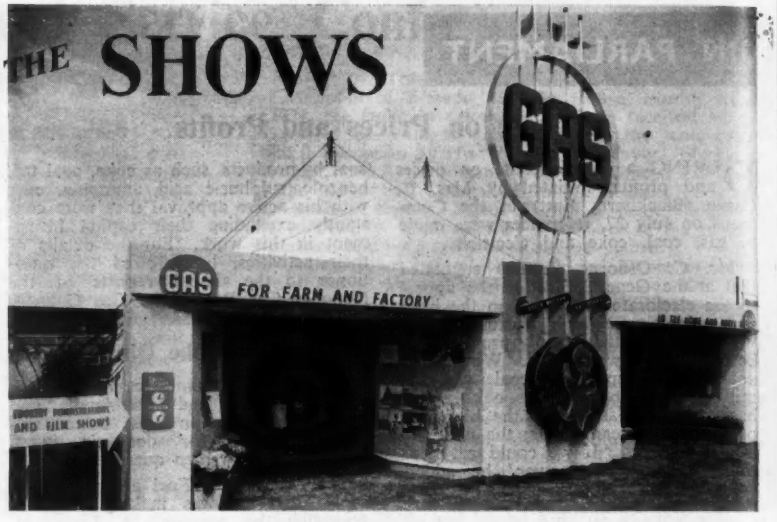
SCIENCE IN INDUSTRY DISPLAY


THE MEASUREMENT OF GAS
GAS WAS ORIGINALLY SOLD ACCORDING TO THE NUMBER OF BURNERS USED
INSPECTORS MADE SURE THAT THESE WERE NOT TURNED ON OUT OF HOURS
HOW IT WORKS
GAS METERS WERE IN GENERAL USE BY 1840
PENNY IN THE SLOT GAS METERS DATE FROM 1889
THE MODERN GAS METER IS VERY ACCURATE

Haberdashers' Aske's School, Hampstead, recently held a three-day Exhibition showing how science links up with British industry. The North Thames Gas Board put in several excellent displays showing gas manufacture, the by-products resulting from carbonisation, and other items of interest to the gas industry generally. One display featured the manufacture and distribution of North Thames gas and another (illustrated above) showed the working of a gas meter. The whole display was designed by the Board's public relations department.

AROUND THE SHOWS

An Illustrated Review of the gas exhibits at further important agricultural events



This striking frontage was designed by the Northern Divisional Display Department of the South Western Gas Board for the gas exhibit at the Three Counties Show, Staverton. Tubular Steel scaffolding supported the circular 'GAS' sign.

FOLLOWING on the success of the gas exhibit last year, the Wales Gas Board was again represented at the Royal Welsh Agricultural Show, Llanelwedd, Llandrindod Wells, on July 25-27. The exhibit was made up of a large marquee, together with the new mobile showroom. The Board's exhibit was situated at the corner of the main avenue, the outside of the marquee and mobile showroom being adorned with floral beds tastefully designed in the paving. At the corner of the exhibit an 18 ft. by 9 ft. greenhouse, made by the Landore Chemical Co., Ltd., Swansea, was displayed.

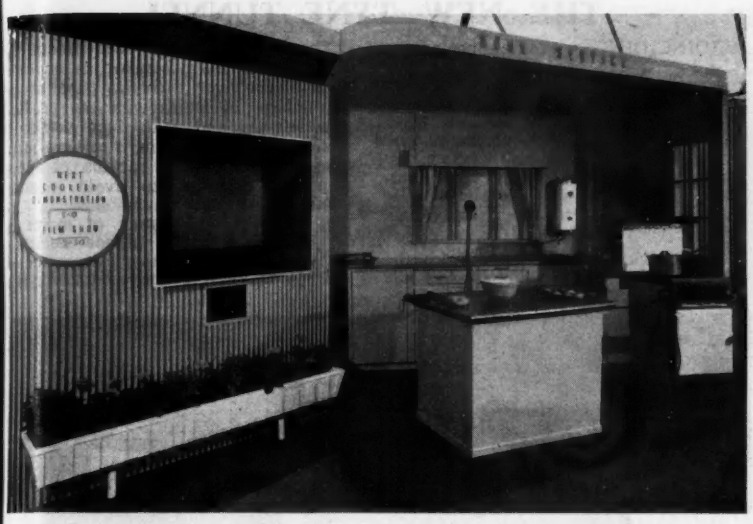
The marquee was very tastefully arranged with a comprehensive display of modern domestic equipment, kitchen cabinets, etc. Cookery demonstrations were carried out in the mobile showroom during the three days of the show. These demonstrations were well attended, there being packed houses on numerous occasions. The home service advisers in attendance, drawn from the Colwyn Bay, East Glamorgan, and Newport groups, were kept busy supplying information as to the necessary procedure to produce the excellent results shown by the bottled fruit display.

Above is another view of the South Eastern Gas Board's stand at the Kent County Agricultural Society's show at Maidstone, which was referred to in detail in the 'Journal' for July 25. The appliance on the left is a bone digestor.

Royal Welsh Three Counties

A model of a Slade Curran grass and grain dryer was on view, similar to a plant of this type recently installed by Mr. Latham, Knowlton Farm, Overton, near Wrexham. This plant is manufactured by one of the largest consumers of the Cardiff undertaking. In this section Gas Council coke displays illustrating the use of coke on the farm and in the home were on view, as also were coke burning heaters and boilers.

The attractive display on the right formed part of the Southern Gas Board's stand at the Royal Counties Show, Southampton, which was the subject of a review in the 'Journal' for June 27. Here is an example of an effective treatment of a greenhouse-heating display as an alternative to placing it outside the marquee.



This corner of the South Western Gas Board's stand at the Three Counties Show illustrates an ingenious combination of cookery demonstration unit and film screen, which has the advantage that the same seating accommodation can be used for both. The film unit is of the rear-projection type specially designed for such shows.

Kent County Royal Counties

together with displays giving information on greenhouse heating, soil warming etc.

For the poultry keeper there was a Stephens Perfection incubator, together with illustrations of the 12,000-egg incubator installed in the area of the Chepstow undertaking. An Eltex brooder, complete with day-old chicks, proved an attraction to the public.

For the interest of the dairy farmer, there was a Stott's bottle steriliser, a Defiance pasteuriser and double stage cooler, and a Brockhouse steam boiler with steaming cabinet and washing trough. Included in this section was a Potterton boiler for hot water supply. A small selection of modern catering equipment was on view illustrating the wide application of gas to meet this demand.

Engineers and managers of neighbouring undertakings within easy access of Builth Wells invited councillors and chief officials of local and county authorities to attend the show, and from the informal discussions which took place it was obvious that excellent relationship exists between them.

The Wales Gas Board made a contribution to the success of the show, indicated by the fact that prior to lunch on the opening day 11,000 people had paid for admission, by supplying the official caterers and others with various items of large-scale catering equipment and with adequate supplies of gas.

Among the visitors to the Board's stand on the first day, were: the Permanent Secretary for Wales of the Ministry of Agriculture; the Hon. P. Pleydell Bouverie, the Managing Director, Calor Gas Distributing Co., Ltd.; Mr. Lyn Howell, Secretary, Welsh Holidays and Tourist Board; several well-known Welsh farmers, and from overseas five Tanganyikan chieftains, nine native administration officials from Northern Nigeria, and Judge Evans of Madison, Wisconsin, who was at one time connected with the Wisconsin and Minnesota Light and Power Company.

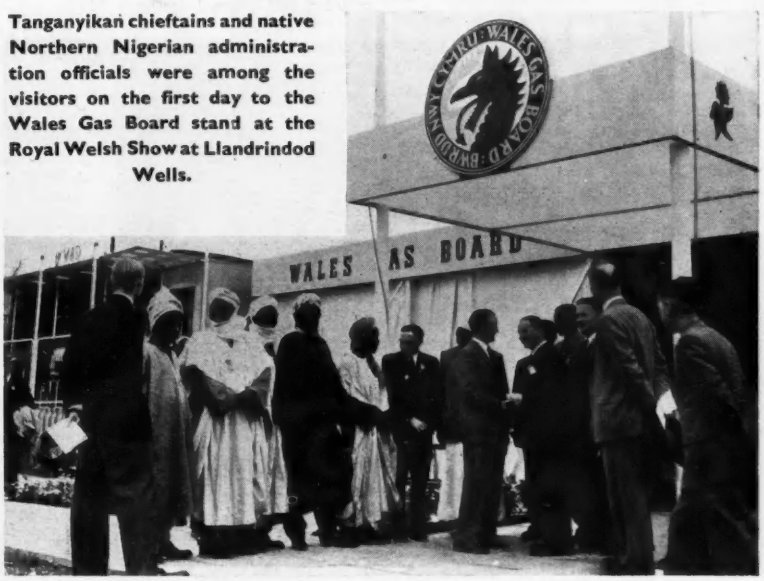
Wales Criticism

A FEW days prior to the Royal Welsh Agricultural Show at Llandrindod Wells (July 25-27), the Wales Gas Consultative Council, meeting at Colwyn Bay, heard a new member, Mr. Kinsey Morgan (Rhayader), criticise the gas and electricity boards for the amount of money they spent in connection with the show.

He alleged that they were competing against one another to advertise the sale of something which 'neither had got.' There was no necessity for State-controlled concerns to spend the money which they did, he added.

Alderman G. F. Hamer (Llanidloes), presiding, said that it was reasonable that the Wales Gas Board should be warned that spending money lavishly, unless justified, was likely to bring the Board into disrepute.

Tanganyikan chieftains and native Northern Nigerian administration officials were among the visitors on the first day to the Wales Gas Board stand at the Royal Welsh Show at Llandrindod Wells.



Post-Script

THE big agricultural shows are mainly over—though there may be a few county and local shows still to come. We think it fitting, therefore, to close this review with a brief summing up of our impressions.

The industry has put forth a fine effort at many different sites and is obviously coming to recognise the value of these big agricultural events as exhibition grounds, which draw many thousands of people—both town and country folk in addition to farmers.

Domestic appliances must, of course, form an essential part of the gas displays; but they must not out-balance the exhibits of purely agricultural interest. We should like to see a greater effort to show the latter in settings more appropriate to their function.

We have noted the criticism voiced by the Wales Gas Consultative Council (above), and do not wholly subscribe to the view expressed. If an industry (nationalised or not) hopes to survive it has got to advertise—and showmanship is only another branch of advertising. Gas is not in competition with electricity alone, and even if it were it still could not afford to stop advertising at these shows or anywhere else.

The Winter Fuel Problem

Methods of alleviating fuel problems during the coming winter were discussed on July 26 by the executive committee of the National Union of Mineworkers, which was considering how to produce more coal, and by a conference of representative organisations who met the Minister of Fuel and Power to discuss electricity peak hour economy, particularly in homes, shops, and offices.

The miners' executive decided to cancel immediately its instruction to suspend Saturday working during the months of July and August. After discussing an urgent message from the Minister of Fuel earlier this month on the danger of a coal shortage arising, partly from the rapid increase in consumption, the executive decided to consult its areas on the resumption of Saturday working. The meeting on July 26 was called specially to consider the result, which showed a majority of more than 100,000 in favour of resumption, though several areas, including Scotland and South Wales, were against it. Saturday working will continue to be voluntary.

At the Minister of Fuel's conference it was agreed that regional committees should be set up to keep the electricity peak load problem before the public and to enlist their help.

Technical Man-Power.—Mr. Alfred Robens, Minister of Labour, has announced in a Parliamentary written reply that it has been decided to reconstitute the Technical Personnel Committee, which, under the chairmanship of Lord Hankey, dealt with questions of scientific and technical man-power during the last war and during the immediate post-war period. The new committee will have rather wider terms of reference than the old one. It will review the requirements for scientists and engineers at home, and especially those arising from the defence programme, in relation to the available supply. It will also consider what more can be done to meet certain important overseas needs for people of the same type.

THE NEW TYNE TUNNEL

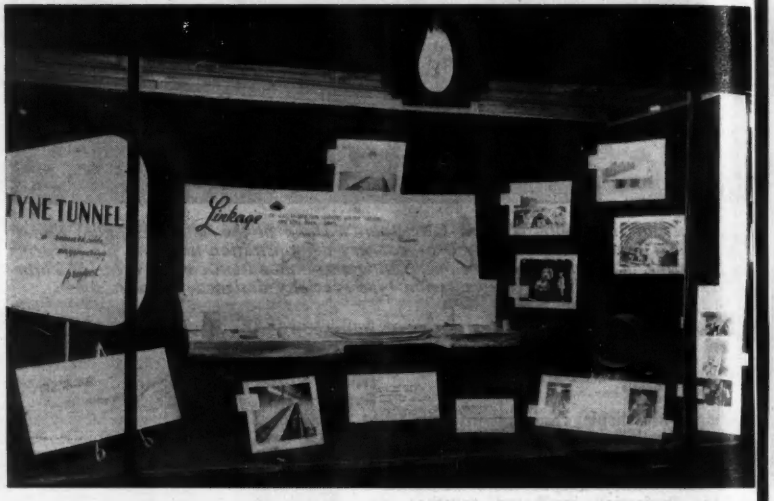
COINCIDING with the opening on July 24 of the new Tyne tunnel for pedestrians and cyclists between Howdon and Jarrow by the Minister of Transport (Mr. A. Barnes), the Newcastle division of the Northern Gas Board exhibited a topical window display at its chief showrooms incorporating a scale model showing a section of the river cut out to reveal the tunnel and the river bed.

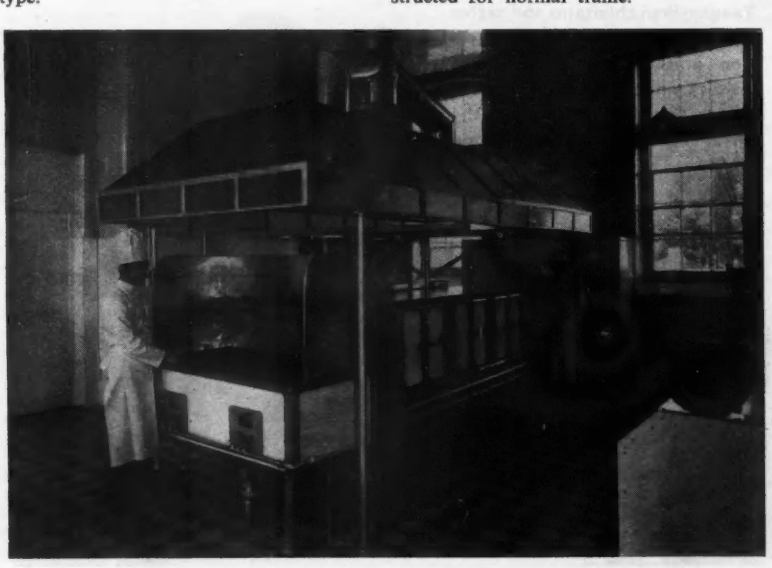
The reason for the link-up with the opening of the Tyne tunnel was the inauguration of the pair of 12 in. steel gas mains laid through the new tunnels marking the completion of a unique engineering project and the provision of a vital linkage in the ring pressure main system.

Two unique features were focused —the new tunnels having the longest escalators in the world and probably the first occasion when gas mains have been laid in under-river tunnels constructed for normal traffic.

The display also included models of Howdon and Jarrow gasworks on each bank of the river; a display panel showing linkage of mains with gas production stations and coke oven works; a section of actual 12 in. steel gas main carried on 'Texolac' packing of resin-impregnated fabric to avoid metallic contact; enlarged photos showing laying, welding, and testing of mains in the tunnel; enlarged photos depicting early progress of tunnel (commenced four years ago) to the completed job; and an educational feature, indicating strata formation encountered in excavation of tunnel (sandstone, silt, boulder clay, coal, gravel, sand, shingle, etc.).

An interesting feature might be mentioned—a squad of 30 Royal Engineers complete with note books and pencils marched down the street and were halted at this particular window and were detailed by their officers to take sketches and complete details of all items shown in the display.





GAS CATERING IN CHANNEL ISLAND HOSPITAL

RADIATION gas cooking equipment has been installed in the kitchens of St. Saviour's Hospital, Jersey, to provide a quicker and more efficient service to patients and staff numbering approximately 300. Our photograph shows the Wardour fish fryer with aluminium screen, and a suite of Chester ovens. Other Radiation equipment installed is a Palace toaster and Chester boiling table.

The Old Forge, Goring

In the accompanying photographs we illustrate two interesting examples—one from the Southern Gas Board's area at Goring, near Reading, and the other from the North Western Gas Board's Mid-Cheshire Group at Sandbach—of what the industry is doing to meet the need in outlying districts for

Small GAS SERVICE Centres

Exterior of the Sandbach Centre

TO implement the policy of giving improved service to consumers, the North Western Gas Board recently opened a new service centre at Sandbach in the Board's Mid-Cheshire group of undertakings. Previously, local consumers have had to journey to the gasworks in connection with any matters of gas service, accounts, or supply.

In October, 1950, the Board purchased the old offices of the Sandbach U.D.C. and rebuilt them throughout as a modern service centre designed solely for consumers' better service. On July 12 the centre was officially opened by Councillor John Shaw, J.P. (Chairman of the Sandbach Urban District Council) who, with Mrs. Shaw, was welcomed on behalf of the North Western Gas Board by Mr. Harry Butters, whole-time Board member. The new showroom is an excellent example of the small service centre.

A GOOD example of how an old building with a definite character can be modified to serve a modern purpose is the Old Forge, Goring, which has been acquired by the Reading and District Gas Undertaking to serve as a showroom. There is no fake antiquity about the Old Forge and its fine, mainly flint walls. Probably built in the early 1700's, it was a genuine old smithy and used as such until quite recently.

Modification of the Forge (part of the back wall had to be reconstructed and new windows fitted) was carefully planned to preserve its character as far as possible and to avoid offending local sentiment. The photographs show the fine old roof and oak tie beams. The architects were Messrs. Sainsbury and Chamberlain, of Reading. We are indebted to the Southern Gas Board for permission to reproduce these notes and illustrations from the June issue of their magazine.

Inside the Goring Centre

THE General Electric Company of India, Ltd., has commissioned at West Bokaro Colliery, Bihar, the first coal cleaning plant to be installed in India. The plant operates on the Chance sand-flotation process. The installation is of particular importance to India because her reserves of good-class coking coal were rapidly diminishing and the remaining reserves were unsuitable for the blast furnaces at Jamshedpur without being ungraded. The coal, which is difficult to wash efficiently, is separaetd at two specific gravities, producing a low-ash-content coking coal, a medium-ash-content boiler fuel, and a high-ash-content refuse which is disposed of at the mine. The plant was recently visited by the senior executives of the Tata Iron & Steel Company, who included Mr. J. R. D. Tata, Chairman; Dr. John Matthai, who recently rejoined the Board after service with the Government of India; and Sir Jehangir Ghandy, agent of the Tata Iron & Steel Company and Chairman of West Bokaro, Ltd. Mr. T. May, Managing Director of the General Electric Company of India, Ltd., was also present. A second plant ordered by the Tata Iron & Steel Company for Jamadoba Colliery is nearing completion. The clean coal from this plant will also be consumed at the Jamshedpur steelworks.

Coke Still Short in the North West

CORRESPONDENCE from the Ulverston Urban District Council asking whether coke supplies could be assured to council houses fitted with coke grates led to a discussion of the position throughout the area at a meeting of the North Western Gas Consultative Council at Southport on July 12, presided over by Councillor C. E. P. Stott, J.P. The Consultative Council had been informed that the North Western Gas Board had appointed a coke sub-committee. One of the questions with which it would deal was the formulation of a scheme to provide for an equitable distribution of the coke available to the Board for domestic consumers. When this question of priority had been settled a further report would be submitted.

Shortage of coke available to domestic users from the Millom undertaking had been referred to the Board who had placed the matter in the hands of the Group General Manager for investigation. The explanation was that 50% of the total sales of coke at Millom was supplied to the Greengarth Hostel which housed workers at the Sellafield atomic plant. The annual tonnage available was 730 (summer) and 670 (winter). Any interruption in supplies to the hostel would be a serious matter. Small lots at works had been 28 lb. per consumer, but recently the quantity had been increased to 56 lb.

The Council regarded the present practice of consumers having to place a separate order for each delivery of coke as both irritating and unnecessary, and there was a recommendation that there should be a reversion to the former practice of enabling customers to place a standing order for their supplies. It was explained, however, that the supplies of coke throughout the area were still insufficient to satisfy the demand and that there was no improvement in stock position.

Uniform Calorific Value

The suggested adoption of a uniform calorific value of gas for the whole country had been referred to the Gas Board. The Secretary (Mr. S. G. Deavin) had replied that he had received a communication from the Chief Technical and Planning Officer to the effect that with present methods of gas manufacture it was highly improbable that a national standard calorific value could be achieved. The available coals in various districts, and the type of plant required for their treatment, tended to limit the degree of standardisation which could be attained. For instance, South Wales coals were of a type which could most economically produce gas of a calorific value round about 450 B.Th.U., whereas in the Northern area, using Durham coals the most economic calorific value was between 475 and 500 B.Th.U., dependent upon the type of plant used. In the North Western Area, using a mixture of Lancashire and Yorkshire coals, and a selection of plant types capable of producing coke to meet the demands of the industrial and domestic markets, the most economic calorific value would be approximately 475 B.Th.U.

A letter from the Kearsley Urban District Council expressed concern at serious increase in the fixed charge which was to be amended from 10s. to 16s. 3d. per quarter. The Council asked the reason for this proposal, which appeared not to be justified in view of the suggested additional increase in the cost of gas per therm.

The Consultative Council had forwarded a copy of the letter to the Board whose Secretary had replied that it was the Board's intention, ultimately, to introduce an alternative two-part tariff to domestic consumers to operate throughout the area, but that the Gas Prices Sub-Committee was not able to recommend that that step should be taken at the present stage. It was able to recommend, however, and subsequently the Board adopted the proposals and the Consultative Council had approved them, that where a two-part tariff was in existence it should be allowed to continue for those consumers who were being charged for gas under that tariff, but that the rates of charge should be brought more into line with present-day costs. The fixed charges were 13s. or 16s. 3d. per quarter, and the commodity rates varied between 10d. and 12d. per therm. These charges were fully justified.

Revision of Tariffs

A communication had been received from the Saddleworth Urban District Council making strong representations on the proposed revised tariffs, particularly as they related to the charges to be made to domestic consumers in the Saddleworth area, to the Council for street lighting, and to the proposed charge to domestic consumers of 2s. per quarter in respect of a certain type of meter. It was submitted that the principle of introducing a meter charge was unfair to a large proportion of small domestic consumers, and particularly so to old-age pensioners. Prior to nationalisation the maintenance, repair, and renewal of meters at Saddleworth was carried out at the expense of the gas undertaking.

In reply, the Board had stated that many old-age pensioners already had a prepayment meter installed, and where this was not the case, and should there be a wish on the part of any such person to have his meter changed there was no reason why he should not make application.

With regard to tariffs, the Board had found an astonishing multiplicity and diversity of methods of charge operating between neighbouring undertakings, and even within the same undertaking, and had decided that it would be improper to perpetuate indefinitely all the differences of treatment. It had determined, therefore, that ultimately a standard tariff, to operate throughout the area, would be introduced, but this could only be achieved by stages.

The costs referred to in the letter from Saddleworth were outside the control of the Board, and embraced coal, oil, and other materials, transport, equipment and labour.

The Council resolved that the Chairman should ascertain from the Saddleworth Council particulars of the transfer of ownership rights in the domestic meters.

The North Valley Services, Ltd., Colne, had also been in correspondence with the Consultative Council with respect to the increased price of gas for space heating which was regarded as too high. The Chairman, Mr. D. P. Welman, in reply explained that the price into holder at Colne was 8.78d. per therm. It was obvious, therefore, that the Board could not continue to charge 5.65d. per therm. In 1948-1949 (prevesting date) Colne consumers were paying 2d. per therm below the cost of making the gas. In addition to 'cost into holder,' the Board was involved in distribution costs and in providing and laying gas mains from the holder to the consumers' premises.

The Chairman submitted a letter from Spratts Patent, Ltd, appealing against the decision of the Board (Liverpool Group) in respect of an increase in charges for gas due to a revision of tariff. They stated that the proposed increase was not entirely appropriate in their case. They had been big consumers of gas in the Liverpool area, and their post-war policy of modernisation and the extension of their Liverpool factory, in line with Government requests for expansion of manufacture in the Merseyside area, had already resulted in a considerable expansion of their gas consumption, which expansion would continue. A considerable proportion of their gas load was carried at off-peak hours as the company's plants were operated on 20-hour shifts.

A copy of the letter had been forwarded to the Board. The Council found no reason why preferential treatment should be accorded and decided that no action be taken.

A Dollar-Earner

The Caterers' Association of Great Britain had asked for special tariffs on the ground that the particular circumstances which would appear to qualify hoteliers and caterers for further consideration was the regular 'all the year round' nature of the load. It was pointed out that the hotel and catering industry was making a substantial contribution to the dollar-earning side of the tourist trade of Great Britain, as well as providing a public service for all sections of the community.

A copy of the letter had been sent to the Board. The Council adhered to its opinion that no reason existed why preferential treatment should be accorded to the application.

DAVID BEAVIS,
Deputy Controller, Edinburgh and South East Division, Scottish Gas Board, makes a plea for

Waverley Association of Gas Managers, Meeting in Edinburgh, June 22.

INCREASED CAPITAL ALLOCATION

ALARM, and even a note of despondency, have been sounded at the high cost of capital plant to-day, and it has been demonstrated (quite accurately) in a number of recent papers that it is impossible to produce gas in new plant and sell it at prevailing prices. The argument runs that extension of production capacity must give rise to heavier capital charges and all-round increase in the price of gas. The old consumer is thus called upon to subsidise the new, and it is claimed that the rising costs may ultimately affect existing business and be to the detriment of the industry.

Arising from this argument, one detects from time to time a reluctance to plan boldly for the future. With the facts from which these conclusions are drawn there is no dispute, but our industry is far from alone in suffering from greatly increased cost of capital plant, and the conclusions drawn are much less certain. It is very much open to question whether the facts provide ground for anxiety beyond the natural diffidence of any manufacturing concern when it observes the price of its products rising.

An examination of the basic industries in which much of the capital equipment was installed pre-war, shows that they all have apparently low capital charges in relationship to cost to-day, and that these charges are rising, and will rise as it becomes necessary to replace pre-war assets. Some offset to this fact can be sought in improved efficiency of new plant and in securing better results from existing plant. This is a very important line of action which our industry would do well to pursue with more determination than prevails. To the extent that industries continue to employ pre-war installations, the present price of their products may be regarded in one way as artificially low. That is but one aspect of the matter. At the root of it all is the reduced purchasing value of the pound.

Still a Good Buy

Taking examples from our own costs in Edinburgh, the price of coal has advanced by 184%, carbonising plant by 200%, oil by 156%, but the price of gas has only increased by 85.4% over 1939 levels. The advances in coal, carbonising plant, and oil costs are more accurate reflections of the general rise in price levels than the relatively moderate increase in the price of gas. Gas, therefore, in Scotland at any rate, is still a good buy, and it is that fact allied to its intrinsic merit which produces the continued rise in demand. Of course, the price will rise as additional plant is installed to meet increased outputs, and no doubt the rate of increase in sale of gas will taper off, as the price rises, to something more akin to the gentler gradient of the 1930's. I am sure, however, that many of us will be relieved when it does, for the present rate of expansion threatens to outrun our ability to keep abreast of it both in plant and in raw fuel requirements.

There is a vital need to secure optimum results from existing plant. The annual production of gas in Scotland is now of the order of 50,000 mill. cu.ft. Assuming the maximum week to be one-fortieth of this figure—*viz.*, 1,250 mill. cu.ft., an average production per day is required during the maximum week of 180 mill. cu.ft. An improvement of output by 5% from existing plant is equivalent to the construction of a works of 9 mill. cu.ft. daily capacity, a project which today would cost over £2 mill. It is believed that an average increase in yield of this order from existing plant is possible. The advantage of better plant performance need not be further stressed, but it is one of the dangers of a vast organisation such as ours that the importance of a seeming humble task like retort house control may be forgotten.

Perspective in this, too, must be preserved. While the scope for greatest improvement relative to size lies in general in the small works, an improvement of 1% in a large works will yield a far greater return than 20% in one of its more humble fellows. Any tendency to dissipate technical staff in tuning up small works to the detriment of the large is to be guarded against, though there is a natural inclination to let the larger units live on their fat while achieving spectacular results in the small.

Baronial Excesses

Another facet to capital expenditure to-day is that it is rationed in the control of our national economy. The companies and local authorities of pre-war years, so long as they commanded the confidence of investors, had no other hindrance to their flotation of capital. Today, only a certain measure of cloth is afforded to the industry, and care must be taken that it is used for necessary garments. One must deplore the expensive embellishments and excessive trimmings of some of the plants being installed today. A gasworks is an industrial site, and while I would be the first to support good clean lines, battlements and magic casements are rather out of place. The operation of the Town and Country Planning Act must take its share of blame for these baronial excesses. The desirability of a measure of control of industrial development is disputed by few, but too often the Act is operated without regard to economics. It may be a matter for regret, but it is the hardest of facts that in industrial development economics come first and all the time. It is a pity that holders on gasworks and cooling towers at power stations are necessary, but the diminution of civic amenity by their erection is insignificant compared with the enhancement of amenity by the production of smokeless fuel, the comfort given to citizens in their homes, and the power supplied to factories to provide our means of existence. The provisions of the Town and Country Planning Act, where they result in long delays in erection of plant for the supply of quality fuel, or where they result in the provision of that plant at enlarged costs, are far from being in the national interest. If there is need for control of capital investment, then there is no ground for compelling capital works to be completed at inflated prices.

It is surprising to find that capital expenditure in the gas industry is kept at such a low level compared with that permitted to the electricity industry. It would seem that, since there is a need for control of national investment, capital would be embarked where it would yield the greatest return. The following data were drawn together from the published information at the time of the opening of the Loch Sloy hydro-electric scheme. The scheme, which is not yet completed, has already cost over £6 mill., and when it is in full operation the annual production of electricity will be 130 mill. units, which is equivalent to 4.44 mill. therms. This in turn equates to the annual production of gas from an 18,000 therms per day carbonising installation. Such an installation, with all ancillary plant, would cost some £50 per therm, or rather less than £1 mill. If the heat value of coke and tar is brought into the computation, the comparison becomes close on three times as favourable to gas. At the inception of the Loch Sloy scheme, the number of such projects promoted by the North of Scotland Hydro-Electric Board was 19, with an anticipated annual output of 1,600 mill. units. The

thermal equivalent of this is a little more than 50% greater than that of the present volume of gas sent out each year from Granton works, and only half the total heat content of gas, coke, and tar.

In view of the much greater return from capital investment in the gas industry, there is therefore the strongest of cases for a substantial increase in the allocation to permit of more rapid expansion. It is argued that works plant, pipes, and so forth are available from a limited number of sources, and that expansion beyond the capacity of these sources to supply is impossible. That is true, but it is also true that if the rate of investment is kept at its present figure there will be no expansion of these sources, and that the carriage of the gas industry will run the danger of proceeding with the brake on permanently. The contracting industries supplying the electricity industry have not been slow to adopt measures to step up their capacity in an endeavour to meet the large investment in that industry.

DISCUSSION

Mr. A. McFadyen (Dumbarton), agreed with the author's remarks on capital expenditure. In spite of the rising costs of installation it should be the aim of everyone to equip his works with the best modern fuel-saving plant possible. New plant being erected to-day should be capable of producing and selling gas at the same price as the old plant. That policy should be to eliminate the old plant, especially in larger works; such a policy would pay.

Mr. David Fulton (Helensburgh; part time member, Scottish Gas Board) said that since nationalisation the expenditure on new gas plant had been great and an impetus had been given to capital expenditure. He could not quite conceive why Mr. Beavis was complaining so strongly. There was only one yardstick to apply to capital expenditure—namely, not the showing of an immediate return but the showing of a reasonable return in time. One of the problems often confronting them was a proposal from an industrial consumer taking an enormous quantity of gas at what seemed to him an economic price but which was not an economic price to the Board when the cost of the necessary plant was considered. The use of their commodity tended to increase but that use had to be concerned with the efficiency of the national economy. Their welfare was bound up with the welfare of their domestic and industrial consumers.

Mr. Beavis remarked that there had been a speeding-up of capital expenditure since vesting day. The growing demand from people willing to pay an economic price justified them going forward boldly and asking for a larger slice of the national cake.

Mr. E. G. Smith (Glasgow) said that if the Scottish Gas Board had been faced with increased capital expenditure since nationalisation they had to remember the lower capital costs at which the local undertakings had been acquired. As far as electricity was concerned Mr. Robens, former Parliamentary Secretary to the Ministry of Fuel and Power, had said in Glasgow not long ago that it was necessary to increase the elbow power in works from 2 H.P. to 6 H.P. That could only be done through electricity. To compare capital expenditure on electricity on a thermal basis with that on gas was wrong.

World Power Conference

To Meet in South America in 1954

THE 1950 annual report of the World Power Conference just issued from the Central Office, 201-202, Grand Buildings, Trafalgar Square, W.C.2 (1s. 6d. post free), summarises the proceedings at the London meetings in July of last year and recalls that early in 1950 the Non-Governmental Organisations Committee of the Economic and Social Council of the United Nations recommended the transfer of the World Power Conference, among other organisations, from the list of organisations enjoying Category B Consultative Status to the Secretary-General's Register. The recommendation was considered as a matter of urgency at a meeting of the International Executive Council in London, when a resolution was passed urging the Economic and Social Council not to adopt the recommendation. Despite the resolution, the recommendation was confirmed, but in communicating the decision the Secretary of the Council emphasised that the World Power Conference remained in consultative status; it was only the *type* of consultative status that had been changed.

The report says: 'The Central Office believes that an error of classification has been made by the Economic and Social Council, probably due to a belief that the World Power Conference is more highly specialised than is, in fact, the case.' Application for re-transfer can be made after the lapse of two years. The question of making such application in 1952 engaged the attention of the International Executive Council at its session in New Delhi early this year and is being actively pursued by the Central Office.

At the recent annual general meeting of the British National Committee, Dr. A. Parker, C.B.E., Director of Fuel Research, Department of Scientific and Industrial Research, was elected to fill the vacant post of Hon. Secretary. The other officers of the Committee are: Sir Vincent de Ferranti, M.C., Chairman; Mr. Harold Hobson, Vice-Chairman; and Colonel C. M. Croft, D.L., J.P., Hon. Treasurer.

At a meeting of the International Executive Council in Paris in July, it was decided unanimously to accept an invitation from the Brazilian National Committee which, with the support of the Brazilian Government, has issued an invitation for a Sectional Meeting of the World Power Conference to be held at Rio de Janeiro in July-August, 1954. This will be the first occasion on which a World Power Conference will be held in South America. The International Executive Council gave preliminary consideration to the draft programme, submitted by the Brazilian National Committee. The topics to be discussed will centre round the special power and fuel problems of the tropical and sub-tropical countries.

The Council decided to admit the German Federal Republic and Japan as members of the World Power Conference. National Committees have been formed in both countries.

STEEL INDUSTRY CO-OPERATION

Lord Bruce, Chairman of the Finance Corporation for Industry, Ltd., speaking at the Corporation's annual meeting in London asked if, in this new world, with all the changes that had come about, we were not being extraordinarily stupid in allowing the question of nationalisation *versus* private enterprise to become a great political issue. Under modern conditions the activities of private enterprise must be integrated into the overall national economy, and he suggested that the answer had been found in the iron and steel industry.

He had attended the inaugural ceremony of the Steel Company of Wales at Margam, and he thought all who did so must have been deeply impressed by what had been achieved. Lord Bruce said he was confident that this great industrial plant would provide an ever-increasing source of production, employment, and profit. 'I trust that, when it does, politicians will not forget, and will, in fact, admit, that its success is founded on private enterprise and private finance and will not be tempted to claim it as evidence of the success of nationalisation. The achievement at Margam should be an inspiration to British industry. I go further and say that the organisation and co-operation achieved in the iron and steel industry should be the model for other industries. On such a foundation I believe we can build the industrial machine, which is essential if we are to reconcile the needs of rearmament and the export trade and overcome the tremendous financial and economic problems that face us.'

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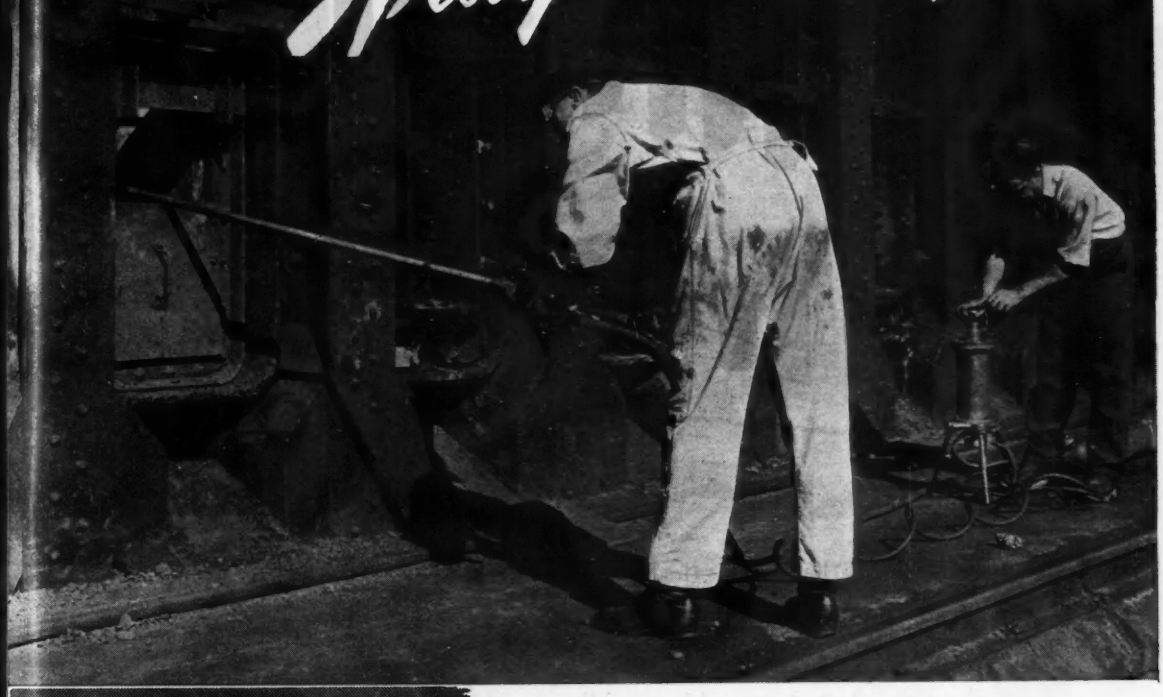

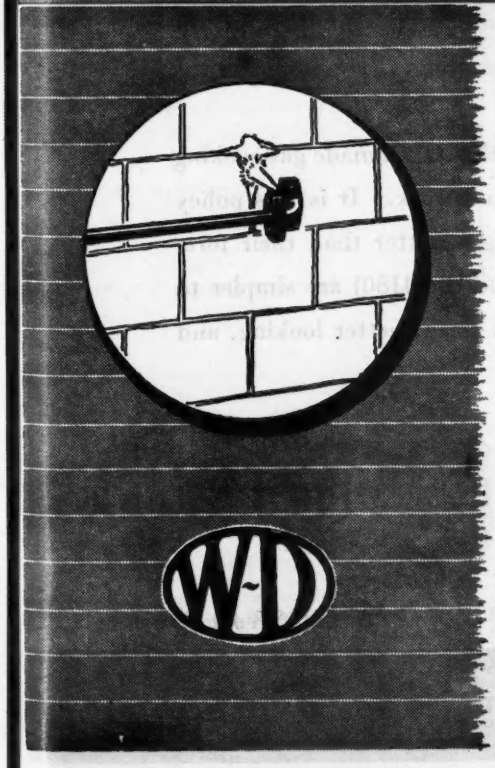

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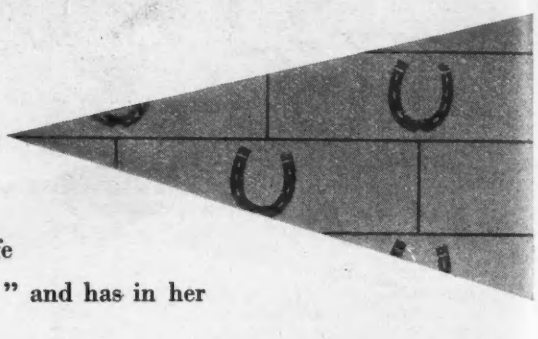

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Background to PROGRESS

Elland has a history which extends to before the Norman Conquest, and it is interesting to note that in A.D. 1317 Edward II granted a Charter to Sir John de Eland, which gave him the right to hold "A Market and two Fairs" in the town. Eland Hall, illustrated above, with its unusual rose window, is a good example of early Seventeenth Century West Riding Architecture.

Whilst Rose Mount Iron Works cannot claim an origin as remote as the town in which it now occupies the leading industrial place, it can modestly point to a steady growth extending for nearly a century. From 1855, when Rose Mount Iron Works came into being, Dempsters of Elland have steadily built a tradition for sound construction and technical excellence in Gas Works Plant, with an extensive range, comprising :—

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B.W.

GAS COOLING and WASHING PLANT

This paper to the London and Southern Junior Gas Association deals with the fundamental factors governing the selection and design of the various items of plant required for the wet purification of coal gas.

by

J. B. McKEAN, B.Sc.
A.R.I.C., A.M.I.Chem.E., M.Inst.Gas.E.

Chemical Engineer,
South Eastern Gas Board
Central Laboratories.

DURING the last 20 years several notable contributions to the subject of the wet purification of coal gas have been given and among these have been the papers by Pexton, Dougill and Ravald[1], Francombe and Grant[2], Bureau[3], Hollings and Hutchison[4], Silver[5], and Spivey[6]. This paper is mainly a record of some thoughts concerning the design of wet purification plant for the cooling and washing of gas and describes a plant put into operation since the war at the Rotherhithe works of the South Eastern Gas Board. It is not proposed to deal with the dry purification of coal gas, and in using the term wet purification it is not intended to refer to liquid processes for the removal of hydrogen sulphide, but only to the cooling of hot crude gas and the removal of tar fog and ammonia.

Most people at one time or another look through the advertisement pages in the technical Press and among those with their main interests lying in the direction of gas production the several different schemes for the wet purification of coal gas diagrammatically shown by one well known firm have raised comment. It is apparent that experiences in wet purification differ in various parts of the country and it is not unreasonable to expect that this should be so having regard to the different coals treated and the various methods of carbonisation adopted. Because of these and other factors there is generally a marked difference in the extent to which it is necessary to proceed in order to achieve the objective of simple and trouble-free plant operation.

Governing Factors

The selection and design of the various items of plant required for the wet purification of coal gas are in the main governed by the heat and water vapour content of the crude gas leaving retort benches, by the nature of the liquid and solid organic condensates, by the fog due to tar and water and by the ammonia content of the gas. It is by a suitable combination of various units to deal with these constituents (if heat may be so classified) that the gas produced then only requires the final purification to remove hydrogen sulphide and also hydrogen cyanide.

The extent to which water vapour is associated with the crude gas depends on the nature of the coal carbonised, on the system of carbonisation, and on the treatment given to the crude gas as it leaves the retorts. These factors all have a bearing on the total heat content of the crude gas. Thus, a Durham coal carbonised in horizontal retorts equipped with scrubber standpipes will yield a gas at the retort house with a much higher heat content than the gas obtained from similar coal carbonised in retorts equipped with ascension pipes. Although in each case the crude gas from the retorts will leave the mouthpiece at a temperature of about 700°-800°C., the scrubber standpipe system, affording as it does a convenient method of flushing pitchy deposits from the gas and keeping gas-ways clear, has the effect of causing a marked drop in temperature of the gas without bringing about an appreciable reduction in its total heat content. On the other hand, ascension pipes dissipate a large part of the heat in the crude gas by radiation and convection before the gas passes into the hydraulic main, since the surface available for heat loss is large and the heat is at a potential higher than that in scrubber standpipe gas. The liquor sprays provided in the gas offtakes from coke ovens, intermittent vertical retorts or chambers, and continuous vertical retorts also tend, as with scrubber standpipe systems, to conserve the total heat content of the crude gas although there is a rapid fall in temperature, but the extent to which the gas temperature may be reduced will also be governed by other factors, such as, for example, the proportion of undecomposed steam in the gas.

Typical temperatures of crude gas in hydraulic or collecting mains are given in Table I, together with the total heat and water vapour content of the gas.

TABLE I.
Typical Temperatures and Heat Contents of Crude Gases.

Type of Plant	Gas Temperature °F.	Water Vapour Content lb./1,000 cu. ft. of Gas*	Total Heat, B.Th.U./ 1,000 cu. ft. of Gas*
Horizontal retorts with:			
Scrubber standpipes	165	26·82	32,400
Ascension pipes	140	11·47	15,300
Intermittent vertical chambers ...	170	32·40	40,000
Coke ovens	165	26·82	32,400
Continuous vertical retorts	165	26·82	32,400

* For gas measured at 60°F. and 30 in.: above 32°F.

In view of the variability in the total heat content of crude gas obtained under different conditions, the size of plant necessary to achieve the range of cooling to normal temperatures will vary considerably. It will also vary with the nature of the cooling plant, but it is not proposed to go too deeply into the factors governing design.

It is well known, however, that in the flow of gas across cooling tubes, the overall coefficient of heat transfer is generally some 25% higher than that obtainable with gas flow parallel to the tube axes under similar conditions. The effect of tube pattern is also important in cross-flow, the removal of heat being more effective when the gas is subjected to a zigzag path through staggered pitching. The overall heat transfer coefficient is also a function of gas velocity and the gas film component is generally considered to vary with the 0.75 power of velocity within the usual range of gas velocities involved. To a much lesser extent it is also a function of water velocity. It is by a judicious selection of various factors such as these and assessing their relative importance that economic design can be obtained.

It is of interest to study the effect of the heat content of saturated gas on cooling surface requirements, and from data on axial flow coolers which have been correlated at the Central Laboratories of the South Eastern Gas Board, Fig. 1 has been prepared showing the cooling surfaces required to deal with crude gas saturated with water vapour at different temperatures. It has been assumed that the gas is cooled to within 5°F. of the cooling water temperature and the effect-

of using water at different rates is shown by the different curves reproduced. In the first place, it may be observed that, when using water at a constant rate, although there is a marked increase in the surface required as the gas temperature rises, the increase in surface is considerably less than the increase in total heat content of the gas. For example, with a rise in gas temperature from 160° to 180°F. the increase in cooling surface is only some 25-30% even when using water at the rate of 60 gal. per 1,000 cu.ft. of gas in both instances, whereas the total heat content of the gas has risen by 120%. This disparity will be readily understood when it is realised that the increase in total heat content is almost entirely due to the latent heat of the additional water vapour carried by the saturated gas, and because of this the heat transfer coefficient of the gas increases as the water vapour content rises.

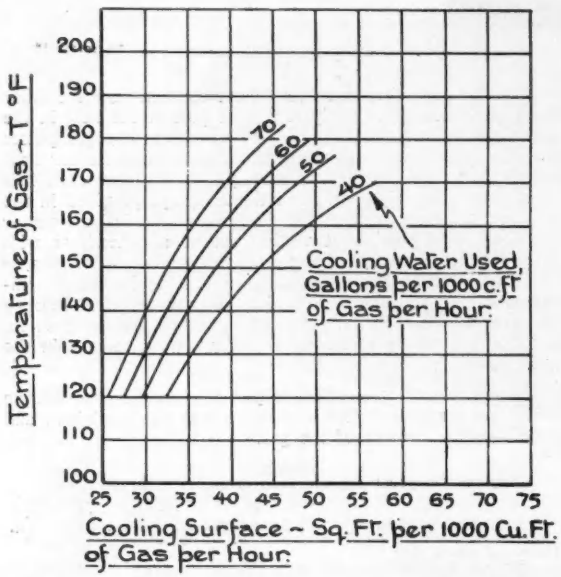

Fig. 1.—Water Tube Coolers. Surface required to cool saturated gas at T°F. using water at different rates. (Gas velocity 8 ft./sec. S.T.P. gas cooled to 60°F. Water at 55°F.)

In these curves indicating the cooling surface required at various water rates, the appreciable reduction in the cooling surface for a given duty when using more water clearly shows the effect of the greater mean temperature difference between gas and water due to the lower temperature rise of the latter. It is also apparent that gas at a higher temperature can be accommodated readily on the same cooling surface by an appropriate increase in the cooling water rate. Thus it is possible on a given cooling surface to deal with quite a wide range of heat load due to temperature, given the ability to supply the appropriate quantity of water. In a similar manner a wide range of heat load due to variation in the quantity of gas at a specific temperature can also be dealt with by variation in the water supply, and this point is important when considering the provision of standby cooling capacity.

Cost of Cooling Water

In the selection of gas coolers, it is necessary also to pay regard to the cost of the cooling water, and this point has been ably made by Francombe and Grant in their paper to the former Southern Association of Gas Engineers and Managers. Cooling water may vary widely in cost depending on its source, and where its cost is high it is preferable to be generous in the size of coolers so that the greatest economy in the use of water can be achieved. It is of interest to study the effect of the charges due to water and of the capital and maintenance charges in considering the economic size of cooler. Taking a typical example of cooling saturated gas from 165°F. to within 5°F. of a cooling water supply at 55°F. various sizes of cooler may be selected depending on the rate of water supply. The comparative costs when dealing with a 6 mill. cu.ft. per day maximum load are indicated in Fig. 2, and it may be noted that with the cheaper water supplies it is preferable to design so as to make use of the maximum quantity of water. With increasing rate of water supply, however, the sum total of the charges—*i.e.*, capital, depreciation, and running and maintenance plus water—begins to rise appreciably at a water cost of 3d. per 1,000 gall. Above this figure, the effect of saving in capital charges by reducing the size of unit required is outweighed by the mounting costs due to the greater quantity of water necessary.

Two Stage Cooling

Although the greatest economy in the cooling of gas is obtained by single stage cooling, two stage cooling is considered desirable where it is necessary to eliminate the effects of the temperature rise of gas passing through exhausters and where gas with a high naphthalene content is being treated. Although only the total heat content of the hot crude gas will affect the size of cooling plant required and the water requirements, the naphthalene content may dictate the nature of the plant installed.

The amount of naphthalene produced in carbonisation depends very largely on the extent of secondary cracking in the retorts, the two extremes of which are generally given by coke ovens and continuous vertical retorts. The quantity appearing in the hot crude gas will depend firstly on the amount produced and secondly on the partition of naphthalene between the hot crude gas and the hot tar initially precipitated

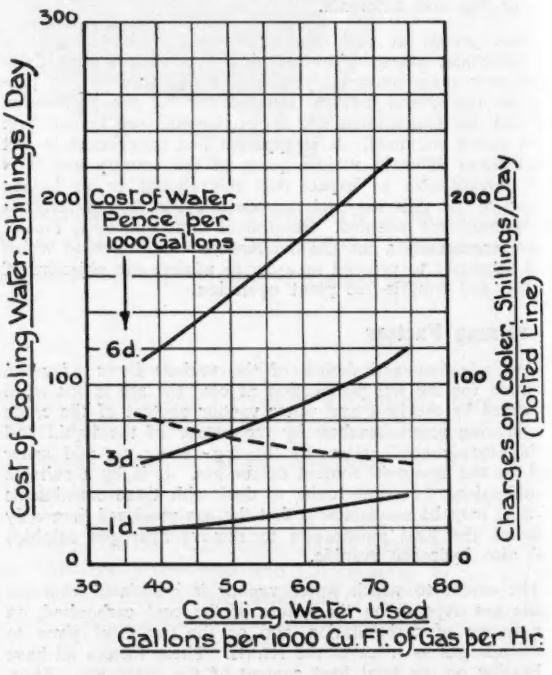

Fig. 2.—Water Tube Coolers. Cost of cooling water and charges on cooler with water used at different rates. (Gas load 6 mill. cu.ft./day of gas saturated at 165°F., cooled at 60°F. Water at 55°F.) Interest and depreciation and repairs and maintenance on cooler at 13%.

at the carbonising plant; the precipitation of the hot tar is in turn governed by the temperature prevailing in the gas collecting system and the quantity formed. Typical results for the naphthalene content of hot crude gas leaving carbonising plant are given in Table II.

TABLE II.
Naphthalene Content of Hot Crude Gas.

Type of Plant	Temperature of Gas	Naphthalene in Gas grains per 100 cu. ft. at S.T.P.		
	°F.	In vapour phase	In tar fog	Total
Horizontal retorts with:				
Scrubber standpipes ...	165	250	20	270
Ascension pipes ...	140	93	70	163
Intermittent vertical chambers	170	—	—	160
Coke ovens	170	320	10	330
Continuous vertical retorts ...	150	—	—	110

It is of interest to note that the naphthalene dissolved in tar fog particles is generally small in relation to the total quantity in the hot gas, especially where temperatures are high. The larger volume of hot gas saturated with water vapour from the scrubber standpipe system on horizontal retorts also carries a much larger quantity of naphthalene than the saturated gas at a lower temperature from ascension pipes. With both these systems the coal carbonised and the retort benches are substantially identical.

In cooling hot crude gas, naphthalene is deposited with the liquid tar products, being partitioned between the gas and liquid phases. With fall in temperature a point is reached when the gas becomes saturated with respect to naphthalene vapour and there is insufficient light tar condensate to dissolve the precipitated solid. Where this 'dewpoint' for naphthalene lies will depend largely on the methods of carbonisation, but for a gas from Durham coal carbonised in 21 in. by 15 in. horizontal retorts in 10 hours it corresponds to a temperature of about 85°F. The incidence of naphthalene deposits may also be influenced by the nature of the gas cooling plant installed, and in modern high velocity coolers, which are probably more liable to give fog formation of condensates, a high proportion of the naphthalene appears as fog after cooling. In Table III typical results showing the change in naphthalene content of gas from horizontal retorts and coke ovens as it passes through primary coolers and turbo-exhausters are set out and it will be observed that the vapour phase naphthalene in the crude gas after the coolers and the turbo-exhausters is below the saturation level in each instance, but the quantity carried forward as fog, probably dissolved in tar droplets, gives a total naphthalene content well above the saturation level. The turbo-exhausters effect some reduction in the naphthalene fog, but the major portion passes forward to be trapped in the secondary coolers and finally in the electro-detarrers.

TABLE III.

Type of Plant	Temperature of Gas	Naphthalene in Gas grains per 100 cu. ft. at S.T.P.		
	°F.	In vapour phase	In tar fog	Total
Horizontal retort gas (Scrubber standpipes):				
Inlet primary coolers ...	165	250	20	270
Outlet primary coolers ...	97	27	170	197
Outlet turbo-exhausters...	101	40	120	160
Coke ovens:				
Inlet primary coolers ...	170	320	10	330
Outlet primary coolers ...	84	23	122	145
Outlet turbo-exhausters...	90	37	95	132

The deposition of naphthalene on the water tubes of coolers under conditions where there is insufficient tar to dissolve the solids has been dealt with in several ways. An old established practice is the continuous circulation of tar down the tubes to give a continuous removal of the deposited solids, but this may be expensive in power absorption having regard to the head required and to the quantity which has to be circulated in order to provide adequate wetting of the tubes. A less costly procedure is the use of a heavy flush of tar for only a short period at intervals of several days, so as to clean the tubes more by the immediate mechanical action than by a simple physical solution of the naphthalene.

The solvent action of tar has also been used for the removal of solids from the low temperature end of coolers by the simple expedient of reversing the flow of gas through the unit. Tar deposited from the hot gas will effectively remove naphthalene, but unless the coolers are fairly closely proportioned to the duty in terms of gas load and temperature it is conceivable that this procedure will tend to drive the solids to the centre.

The problem of naphthalene deposition in the secondary coolers has also been dealt with by the use of naphthalene washers interposed between the exhauster and secondary coolers, but when using oils of mineral origin this practice would appear to necessitate the use of an electro-detarrer before the washer so as to avoid fouling the wash oil with tarry compounds.

The use of electro-detarrers for tar fog extraction has been fully covered by several papers given in recent years and particularly so by Francombe at a recent meeting of the Institution of Gas Engineers.[7] In addition to the fog due to tar and liquor these units effectively remove solid naphthalene particles

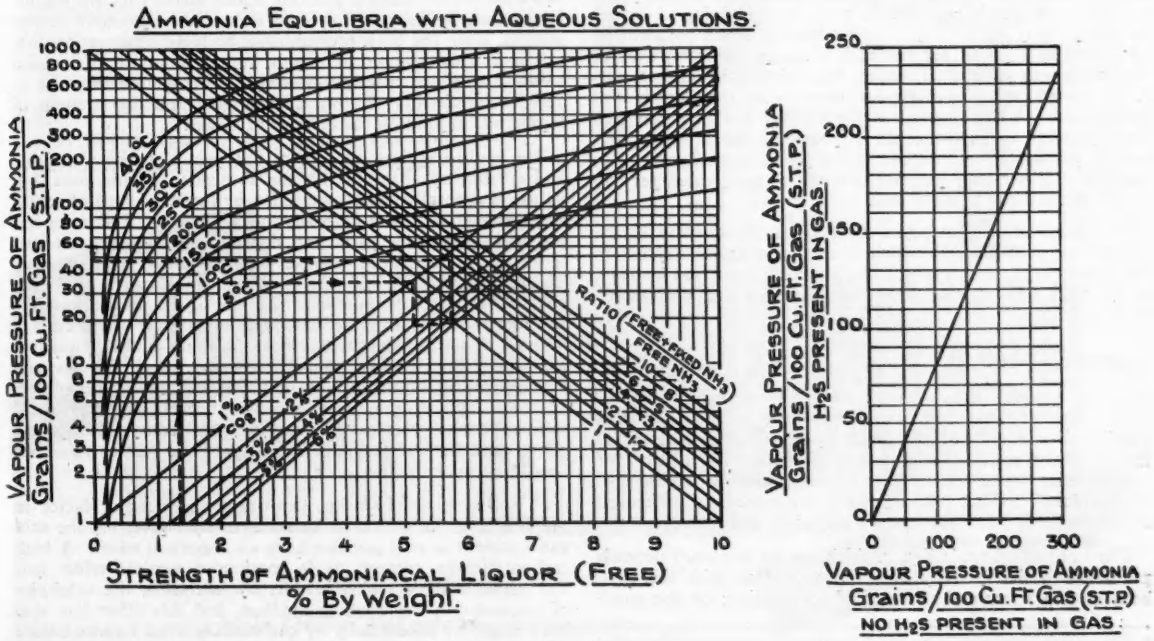
AMMONIA EQUILIBRIA WITH AQUEOUS SOLUTIONS.
VAPOUR PRESSURE OF AMMONIA Grains/100 Cu.Ft. Gas (S.T.P.)
STRENGTH OF AMMONIACAL LIQUOR (FREE) % By Weight.
RATIO (FREE+FIXED NH3 / FREE NH3)
VAPOUR PRESSURE OF AMMONIA Grains/100 Cu.Ft. Gas (S.T.P.) H2S PRESENT IN GAS.
VAPOUR PRESSURE OF AMMONIA Grains/100 Cu.Ft. Gas (S.T.P.) NO H2S PRESENT IN GAS.

Fig. 3.

carried forward from gas coolers, and apart from electrical faults the main troubles associated with their operation are due to such solids, necessitating steaming out at intervals. A liquor spray system may also be incorporated to facilitate cleaning. With regular attention so as to maintain clean conditions and high efficiency, a drill essential in all sound works practice, the units will operate with relatively little trouble.

It is generally recognised that electro-detarrers are capable of removing tar fog from coal gas with an efficiency of over 99% under the correct operating conditions, and the idea has thus grown that they will provide the means of preventing the accumulation of tarry organic matter in oxide boxes. More recently, it has been suggested in the survey on oxide purification[8] by the Gas Research Board that efficient removal of tar fog by electro-detarrers is not enough to exclude tar completely from oxide boxes and it is stated that spent oxide containing up to 1% of tar is not unusual.*

At one works where electro-detarrers have been installed the organic matter extractable with solvents from spent oxide has risen to slightly more than 2%, whereas previously the tar content of the oxide had been appreciably lower with Livesey washers as the sole means of tar fog removal. The soluble organic matter has changed in nature and it may now be due to an after-polymerisation of some trace constituents of the gas, possibly unsaturated hydrocarbons, owing to the effects of the electric field through which the gas has passed. There is evidence in the literature to suggest that other hydrocarbons, such as methane, may also be affected by the field.

There appears to be little doubt that electro-detarrers can be of real benefit on some works where the tar content of spent oxide cannot be kept within reasonable limits by other means. For works where electro-detarrers are installed the suggestion has been made that a light washing with oil before dry purfiication will remove the hydrocarbons responsible for the 'tar' appearing in oxide despite the electro-detarring treatment and it seems to be a reasonable one. The proof that tarry organic compounds can thus be eliminated, either entirely or only partially, has yet to be obtained, but there is no doubt that the installation of such a washer will add materially to the cost of removing tar fog.

The Livesey washer is the older and nowadays less fashionable form of apparatus for the removal of tar fog. With adequate supervision and good maintenance this unit can give satisfactory service and under such conditions its efficiency can be high. In a series of tests on coal gas containing an appreciable quantity of tar fog, two washers in series reduced the tar to about 3 grains per 100 cu.ft. although the carry-over as water fog was some 30-50 grains, but it is not usual that such a high performance is obtainable except when the plant is well maintained. A disadvantage of the Livesey washer is the high back pressure to be overcome in providing the intimate mixture of gas bubbles and liquor, and a power consumption of at least 1 B.H.P. per hour per million cu.ft. of gas treated per day is not unusual for a single unit.

A feature of the Livesey washer is its effectiveness in the removal of ammonia, in which it can be a useful adjunct to the ammonia washing plant. The stage efficiency can be high, and because of this it is possible to reduce the size of ammonia washing plant.

Ammonia Washing

In the removal of ammonia from gas it is generally important to aim at the production of as strong a crude liquor as possible if concentrated ammonia liquor is to be obtained at the minimum cost. Vitally important factors in the cost of concentrated liquor are the cost of steam and the capital cost of the plant required, both of which are materially influenced by the strength of crude liquor supplied to the plant.

The strength of crude liquor which can be produced depends primarily on the quantity of water associated with the coal, both as free water and as water of constitution; on the quantity of undecomposed steam from carbonising systems in which steam is added to the retorts; and on the water required for washing. For Durham coal carbonised in horizontal retorts the yield of ammonia is generally about 7 lb. per ton and the virgin liquor some 17-18 gall.; the maximum theoretical strength of liquor possible is therefore no more than 3.9-4.1% by weight (18-19 oz.). In normal practice this strength is reduced on account of the water required for washing, although with attention to design this water can be limited to about 2 to 3 gall. per ton of coal. Where steaming is practised, as in continuous vertical retorts, it is not generally possible to produce liquor of this strength because of the water added to the system as undecomposed steam, the final strength depending on the degree of steaming and on the quantity of water used in washing.

Use of Soft Water

In order to obtain economical and trouble-free absorption of ammonia from gas it is important to cool the gas to the lowest practicable limit, to make the best use of the virgin liquor produced in the gas cooling process, and to avoid fouling of the washing surfaces by cleaning the gas as far as possible from tar fog, etc., and by using softened water so as to minimise the deposition of chalk. Reference is made later to a system associated with effective two-stage gas cooling and scrubber standpipes in which full use is made of the virgin liquor produced and no more than 2 to 3 gall. of soft water per ton of coal is used for final reduction of ammonia content of the gas to 5 grains per 100 cu.ft. The liquor condensate from the primary coolers, after separation from tar, is fed to the scrubber standpipe spray system in the retort houses, where the free ammonia is distilled from the liquor. This distilled liquor contains only about 0.15% of free ammonia and, after separation from tar and cooling, is very suitable for the bulk removal of ammonia from the gas in washers.

In order that the maximum strength of liquor can be produced it is also essential to select the most suitable type of apparatus. Because of the high solubility of ammonia in water, particularly in the presence of acid gases such as carbon dioxide, the volume of liquid required for washing is relatively low and it is therefore difficult to secure an adequate wetting of the washing surfaces when absorbing ammonia in towers of normal cross-section. In such plant it is generally impracticable to produce a strong liquor unless effective wetting is obtained by using a tower of excessive height and narrow section, when the back pressure will be high, or by using considerable recirculation of liquor round a tower of normal section, in which case several stages are required in order to achieve satisfactory removal of ammonia and the strength of liquor will depend on the number of stages.

The multi-stage rotary washer has proved to be a reliable and satisfactory apparatus for the absorption of ammonia, but its use is generally being superseded by the static type of multi-stage washer, which is normally more efficient. The latter has no internal moving parts and depends only on the external series of re-circulating pumps, one for each stage, for an adequate circulation of the washing medium within the chamber so as to obtain efficient wetting of the washer packing. In order to obtain a high efficiency in each stage, it is necessary to have adequate washing surface, cleanliness of the washing surfaces, a high rate of liquor circulation within the bay and a good degree of turbulence in the gas. The whole subject of multi-stage washing, both from the theoretical and practical standpoints, has been very exhaustively treated by Hollings and Silver[9] and for further understanding of the matter reference should be made to this work.

It is well established that temperature is a major factor in the absorption of ammonia by water or by liquor, but the acid gases present in coal gas also have an important effect. A high carbon dioxide content, as in continuous vertical retort gas, will assist in the washing process by increasing the solubility of ammonia in the washing medium, and this effect has also been employed successfully by carbonating weak liquors before use in washers[10]. In testing the stage (or bay) efficiency of

* 1% of tar in spent oxide represents approximately 10 grains of tar extracted from 100 cu. ft. of gas.

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ammonia washers, it has also been observed that the bays at the gas outlet end invariably show a higher efficiency, and this may be attributed to the beneficial effect of the high CO_2 content of the gas relative to the concentration of ammonia at this point. Hydrogen sulphide also tends to increase the solubility of ammonia, but so far very little use of this property seems to have been possible. When using weak liquors as the washing medium the presence of dissolved fixed salts of ammonia—*e.g.*, the chloride—tends to decrease the solubility of free ammonia, thus reducing the effectiveness of such liquor as a washing medium.

An intensive study of the effect of CO_2, H_2S, fixed salts, etc., on the equilibrium relationship between gaseous NH_3 and its aqueous solutions in the concentrations normally expected in gasworks practice has been made by Pexton and Badger[11]. The results obtained are of great practical value in that they indicate the strength of liquor possible under ideal conditions. As presented they are difficult to interpret for normal gasworks practice and they have therefore been correlated in the form shown in Fig. 3.

A Marked Effect

From the curves it is apparent that the carbon dioxide and hydrogen sulphide in crude gas have a marked effect on the equilibrium vapour pressure of ammoniacal liquors, the effect of the former being the more pronounced. It can also be seen that when using cooled circulating liquor from carbonising plant with 0.15% free and 0.7% of fixed ammonia for washing it is not theoretically possible at a normal temperature of 60°F. to effect a reduction in the ammonia concentration in the outlet gas to a desirable limit of 5 grains per 100 cu.ft. without the aid of water unless the CO_2 content of the gas exceeds 3%. Whatever the CO_2 content, however, it is generally desirable to feed cooled liquor from the circulating system as far down the washer as practicable so as to reduce the use of water to a minimum.

These curves have proved useful in determining the efficiency of washers and have given self-consistent results. A typical set of test data obtained on a 12-bay multi-stage board filled washer when using water only is set out in Fig. 4, which also shows the equilibrium line for the test conditions derived from the curves given in Fig. 3. It will be observed that the bay efficiency is in general about 0.4, except at the weak (or gas outlet) end of the washer where it rises to 0.9. From similar tests made on washer sections without board packing, in which absorption was due entirely to the liquor sprays from the top of the bays, results indicating bay efficiencies of about 0.2 have been obtained.

As a result of an extensive series of tests on the packed washer it has been deduced from bay efficiency, washing surface, and gas load that the overall coefficient of mass transfer for ammonia from coal gas (containing 1.8% of CO_2) to water generally lies about 30 lb. per hour per sq. ft. of washing surface per unit concentration difference (lb. per cu.ft.). The value of the coefficient tends to rise towards the weak end of the washer.

Driving Force

In comparison with previously published data this coefficient is low. Now, its numerical value depends firstly on the actual rate of absorption, but it is also governed by the difference between the partial pressure of the ammonia in the gas and the calculated or determined vapour pressure of the dissolved ammonia at equilibrium—*i.e.*, on the concentration difference or driving force for aqueous absorption. With the curves given in Fig. 3, the equilibrium values for the vapour pressure of dissolved ammonia tend to be lower than those obtainable from previously published data; thus the numerical value of the driving force is larger and the transfer coefficient per unit driving force is diminished. Moreover, the equilibrium data given in Fig. 3 apply to conditions in which complete chemical reaction has taken place in the liquid. Consequently, in the absorption process any resistance due to chemical reaction, which may or may not be slow, will be incorporated in the value for the overall coefficient of mass transfer. Where chemical reaction does occur the actual rate of absorption will be faster than under conditions without chemical reaction, but the apparent anomaly can arise that the overall coefficient of transfer of a gas based on equilibrium values for complete chemical reaction can be diminished when the absorption of the gas depends on the slower absorption of some other reactant. This applies in the absorption of ammonia concurrently with CO_2 and H_2S.

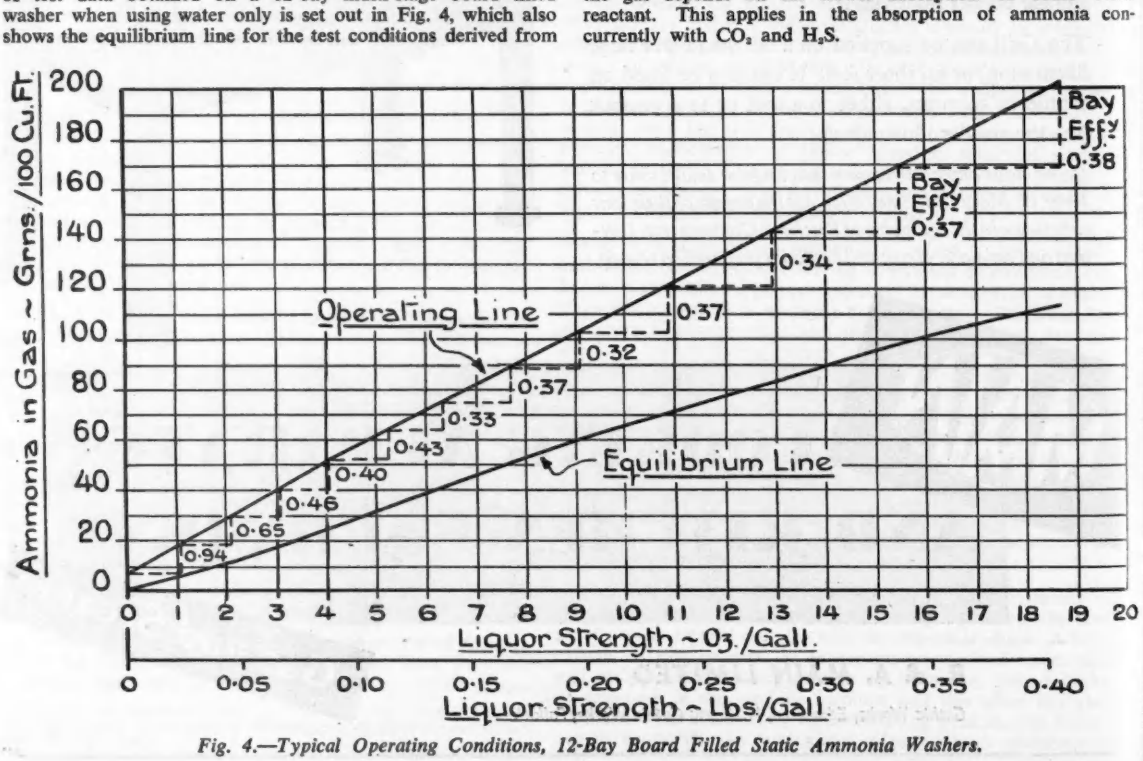

Fig. 4.—Typical Operating Conditions, 12-Bay Board Filled Static Ammonia Washers.

In the absorption of ammonia the rate can be approximately correlated with the absorption of CO_2. Since the latter is probably absorbed at a substantially constant rate throughout a washer it is reasonable to expect that the ammonia will be absorbed as the carbonate at the gas inlet bays and as the bicarbonate at the outlet, where the ammonia concentration in the gas is extremely low in comparison with the CO_2. When the proportion of dissolved CO_2 is high, the resistance to absorption of ammonia due to chemical reaction will diminish, with the result that the overall coefficient of mass transfer will tend to rise. It is for these reasons that the higher bay efficiency and higher coefficient of mass transfer for ammonia at the weak end of a washer can be explained, but it is also apparent that effective washing of ammonia with only weak liquor may be possible given the appropriate proportion of CO_2 in the gas. When the CO_2 content of the gas is inadequate, carbonation of weak liquor with waste gas will undoubtedly have an effect similar to a higher CO_2 content of the gas.

Needless to say, similar arguments may be advanced concerning the absorption of H_2S and its relationship with ammonia absorption, but its effect is not likely to be so pronounced. Whatever the mechanism of the absorption of ammonia, it does seem that consideration given to the design of washing plant, which can increase the absorption of CO_2, will enhance the concurrent absorption of ammonia.

Wet Purification Plant, Rotherhithe

Before concluding this paper it would appear worth while giving a brief description of the wet purification plant put to work about three years ago at the Rotherhithe works of the South Eastern Gas Board. It is an interesting plant in that it is very economical in ground space and provides more or less continuous flow systems for the handling of liquor and tar. The installation handles the gas obtained from four sections of horizontal retorts equipped with scrubber standpipes and comprises two stage gas cooling, turbo-exhausters, electro-detarrers, and ammonia washers, having been designed to deal with 9.6 mill. cu.ft. of gas per day.

The primary coolers, two in number, are of the open top, vertical water-tube type constructed in mild steel. All surfaces in contact with water are galvanised in view of the corrosive nature of the river water used for cooling and, because of the sludge content of this water, hoppered bottoms with quick opening valves are provided so as to obtain regular and rapid discharge of deposited sludge from the water chambers. Provision has been made to control the outlet gas at a pre-selected temperature between 35° and 45°C. by means of air operated 'on-off' water control valves so as to avoid deposition of naphthalene, but a means to remove deposited solids is also given by a false tube-plate with $\frac{1}{8}$ in. annuli round the tubes in the last four of the eight passes, to which light tar condensate can be supplied. Each cooler has been designed to cool 7.2 mill. cu.ft. per day under summer conditions from 185°F. saturated to 95°F.

On leaving the primary coolers the gas passes to a Bryan Donkin double inlet Rateau star-type turbo-exhauster with a similar unit acting as standby. Steam is supplied at 140 lb. per sq. in. and exhausted to the works low pressure steam main at 10 lb. per sq. in., and turbine speed control, so as to maintain a steady vacuum of 5 to 5.5 in. w.g. at the inlet of primary coolers, is obtained by means of a hydraulic regulator.

The two secondary coolers on the turbo-exhauster outlet are similar in design to the primary coolers, having hoppered bottoms for the disposal of river water sludge and also a false tube-plate on all gas passes for the supply of light tar condensate as a flushing medium for deposited solids. In removing these solids a heavy flush at the rate of 15,000 to 20,000 gall. per hour is given to each gas compartment for about 3 min. once in every three or four days and this drill has proved effective and, in comparison with continuous flushing, economic in power. In these units protection from corrosion of the mild steel water chambers is given by a zinc-sprayed coating to a total thickness of 10 thousandths of an inch, this protection being more easily applied to the large water chambers of the coolers than galvanising. There is no evidence after three years that it is less effective.

Although the turbo-exhausters are effective in removing a large proportion of the tar fog leaving the primary coolers two electro-detarrers, each of 4.8 mill. cu.ft. per day capacity, remove the final traces of fog in addition to any formed in the secondary coolers. The high tension supply is obtained from two 90 MVA transformer rectifier units coupled to suitable interconnecting switchgear, so that one or other of the transformer rectifiers can be coupled to either detarrer or to both.

From the electro-detarrers the gas passes through three four-bay mild steel static washers in series with suitable bypass connections. Each bay is packed to a depth of 5 ft. with wood grids made up of $\frac{1}{2}$ in. boards, $\frac{3}{8}$ in. apart, and a motor

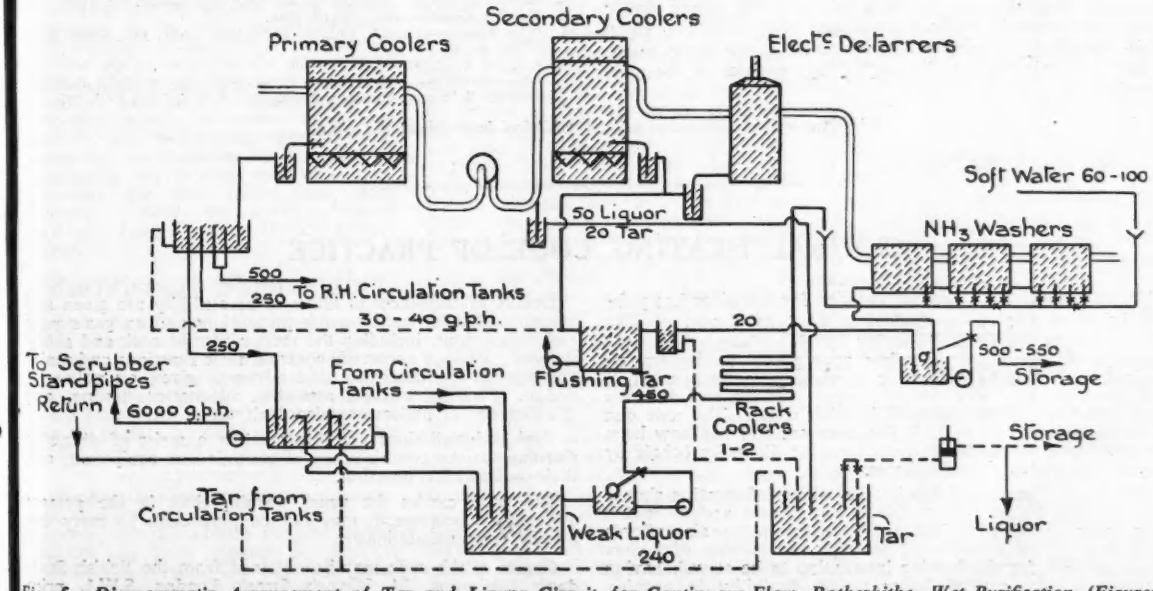

Fig. 5.—Diagrammatic Arrangement of Tar and Liquor Circuit for Continuous Flow. Rotherhithe Wet Purification. (Figures refer to normal flow of tar and liquor. Gas load, 350,000 cu.ft. /hr.)

driven four-cell monobloc pump on each unit re-circulates liquor through each bay. Cooled liquor from the retort house scrubber standpipe tanks, containing about 0.15% of free and 0.7% of fixed ammonia, is supplied to a selected washer bay and the minimum quantity of water required to maintain the required slip of ammonia of 5 grains per 100 cu.ft. is added to the last gas bay. The supply of cooled weak liquor is automatic and continuous and because of the system for handling condensates it is at all times in proportion to the virgin liquor production.

The circuit for handling all tar and liquor condensates is more or less automatic in operation, advantage being taken of the elevated position of most of the plant. Where liquor has to be handled continuously centrifugal pumps coupled with float-controlled valves are used and the only intermittent operations required are the flushing of the coolers with tar and the transfer of tar to the riverside storage tanks.

The system is shown schematically in Fig. 5, and may be briefly described as follows. The tar and liquor condensates from the primary coolers are separated in a mild steel elevated tank of 2,500 gall. capacity, the tar gravitating to a ground level storage tank from which it can be pumped for the removal of naphthalene from the coolers by flushing. The separated liquor condensate is split by four evenly cut V-notch weirs on the tank, each corresponding to a carbonising section, and each of the streams of liquor is fed by gravity to the appropriate tank, from which flushing liquor is circulated to the scrubber standpipe system in the section. In each scrubber standpipe system the condensate liquor is fed directly to the circulating pump inlet so as to ensure that liquor containing free ammonia cannot bypass the circulating system. The tar and flushing liquor returning to the tank from the scrubber standpipes is separated, the tar gravitating to a tar collecting well and the excess liquor, virtually equivalent to the virgin liquor from the coal, to a weak liquor well. From the latter the hot liquor is pumped continuously through rack coolers to the appropriate bay in the ammonia washers, using a float-controlled valve on the pump outlet so as to maintain the discharge proportionate to the make.

Because of the elevation of the turbo-exhausters it is not possible to incorporate the tar and liquor discharged from them in the tar and liquor system and they are drained to a well. The condensate from secondary coolers and the precipitate from the electro-detarrers are almost negligible in quantity and are both led to the flushing tar storage tank, from which the liquor and tar decant through a separator to the strong liquor pumping tank and tar well respectively. The strong liquor from the ammonia washers is pumped continuously to riverside storage, again using a float-controlled valve on the pump outlet to maintain the discharge proportionate to the production.

The approximate quantities of liquor and tar flowing in each part of the system are shown in the flow diagram (Fig. 5) and typical characteristics of the tar and liquor at various parts of the system are given in Table IV.

TABLE IV.
Typical Characteristics of Tar and Liquor from Wet Purification Plant.
Gas load—8·4 mill. cu. ft. per day at 30 in. and 60°F.

Type of Plant	Tar	Liquor		
	S.G. at 60°F.	S.G. at 60°F.	Strength, % W/V	
			Free NH_3	Fixed NH_3
Primary coolers	1·10	1·01	0·82	0·08
Turbo-exhausters	1·07	1·02	1·30	0·54
Secondary coolers	1·01	1·05	6·04	0·04
Electro-detarrers	1·04 *	1·06	6·36	0·19
Ammonia washers	—	1·04	3·56	0·68
Retort house circulation (Scrubber standpipes)				
Supply	—	1·02	0·16	0·76
Overflow	1·20	1·02	0·12	0·86

* Excluding undissolved naphthalene.

This system for handling the tar and liquor would appear to remove about 70% to 75% of the fixed ammonium salts from the crude gas in the scrubber standpipe re-circulating system, in which effective distillation of free ammonia from primary cooler liquor can also be obtained, so as to give a weak liquor suitable as a bulk washing medium in the ammonia washing process. This weak liquor overflow from the re-circulating system has an oxygen absorbtion (4 hr. 27°C.) of about 870 parts per 100,000 and is not dissimilar to effluents from concentrated liquor plants in this respect, although it must be remembered that ammonia does not react with permanganate. The liquors from the secondary coolers and detarrers, although small in quantity, are of a high strength.

With such characteristics of the tar and liquor it would seem worthwhile to attempt to create a standard plant layout using units of a well proved model, modifying the requirements to suit special conditions.

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3. 'Design and Performance of Water Tube Condensers.' Bureau, *Gas Times Supp.*, November, 1945.
4. 'Gas Purification,' Hollings and Hutchinson, J.S.C.I. 1935, **54**, 726.
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(A report of the discussion will be published in a subsequent issue.)

CENTRAL HEATING CODE OF PRACTICE

THE Council for Codes of Practice for Buildings has published in final form Code 332.303, 'Installation of Gas Fired Boilers for Central Heating by Hot Water.' The code includes consideration of points appropriate to boilers required to provide hot water for domestic purposes in addition to space heating. The design of space heating and domestic hot water systems is dealt with in other codes. The code was previously issued as a draft for comment and has now been revised by a committee convened on the Council's behalf by the Institution of Gas Engineers.

The code lists essential points on which information should be obtained before installation is commenced and to enable the work to be fitted into a time schedule. It also affords guidance on the selection of the type and number of boilers most suitable for the heating installation to be served, having regard to adequacy of boiler rating, flexibility in meeting variations in the load, and preserving continuity of supply.

Details of clearances to allow of accessibility are given and recommendations made on fire precautions and on gas supply and connections, including the master control cock and safety devices. Various automatic controls, their functions and major components are described, and advice is given on points of design. Packing, storage, assembly, adjustment, testing, and maintenance of boilers are also dealt with.

Typical installations are illustrated in a series of diagrams showing various combinations of controls and equipment, and their points of connection.

The code carries the usual warning that, in the present abnormal conditions, it may not be practicable to carry out all the recommendations.

Copies of the code may be obtained from the British Standards Institution, 24, Victoria Street, London, S.W.1, price 3s. post free, reference CP 332.303 (1951).

TRADE NEWS

Richard Klinger

The new $\frac{3}{16}$ in. bore high pressure piston valve is tested hydraulically to 9,000 lb./sq. in. and is suitable for oil working pressures up to 5,000 lb./sq. in. and for use with superheated steam up to 2,000 lb./sq. in. Added life and strength is achieved by having the diameter of the spindle larger than that of the piston, so that the load exerted on the thread when operating the valve is very small.

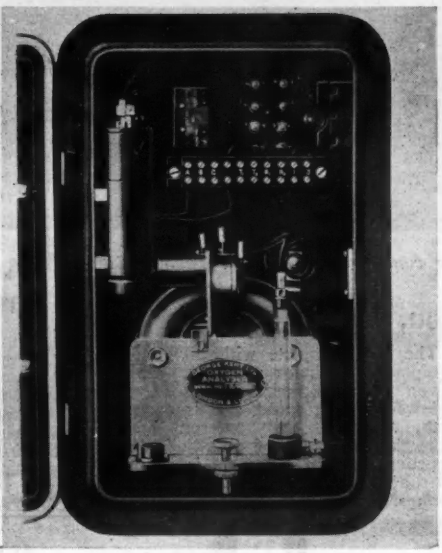
As with other 'Klingerflow' valves, throttling has no adverse effect on the efficiency of the valve, as wire-drawing will be experienced only on the bottom of the piston, whereas the sides of the piston, which actually seal the valve, remain unaffected. Maintenance is straightforward, and when after long service, wear takes place, resulting leakages can be corrected immediately by tightening the bonnet nut, thus compressing the two valve rings more closely around the piston.—*Richard Klinger, Ltd., Klingerit Works, Sidcup, Kent.*

Burntisland Shipbuilding

The Burntisland Shipbuilding Co., Ltd., Burntisland, Fife, has secured a contract to build a further 2,825-tons dead weight motor collier for the South Eastern Gas Board. The propelling machinery will consist of 1,150 b.h.p. diesel engines constructed by British Polar Engines, Ltd., Glasgow.

Benham & Sons, Ltd., cooking apparatus makers and heating engineers, announce that the address of their Cardiff branch, as from August 1, 1951, is 39, Charles Street. The telephone number remains as before: Cardiff 6463.

George Kent, Ltd.



A new paramagnetic continuous oxygen recorder for use in industrial processes is announced by the above company. Robust, reasonably priced and accurate, the new instrument is in complete contrast to the expensive and complicated equipment in common use until recently. Although many new applications will no doubt suggest themselves, the new recorder will meet all the usual demands—*e.g.*, for the analysis of furnace atmospheres in the metallurgical industries, determination of the efficiency of the liquid-air process of oxygen manufacture, analysis of waste gases from open-hearth furnaces in the steel industry, estimation of oxygen in the atmosphere for the food industry, assessment of the combustion efficiency of glass-melting furnaces, analysis of flue gases in boiler plants, measurement of oxygen content in processes for purifying domestic supplies of coal gas and in oil refineries and the chemical industry, etc. It is expected that many industries which have in the past relied on inferential oxygen analysis (depending on the estimation of the content of other gases) will now adopt direct analysis with the new instrument.

Mounted in a small cast aluminium case, the primary unit is neat and compact, easily installed and requires practically no maintenance. All parts of the unit in contact with the gas sample are made of corrosion-resistant materials. The installation is entirely mains-operated, and a constant-voltage transformer is supplied with the equipment to smooth out supply-voltage fluctuations. The primary element (the analyser) can be located at any distance up to 400 yds. from the recorder.—*George Kent, Ltd., Luton, Beds.*

Pulsometer Engineering

In the operation of coke ovens, gasworks, and other carbonisation plants, as well as in many chemical works, oil refineries, and other establishments, pumps are often required to operate under extremely difficult conditions. When the quenching and conveying water is only used once and then discharged to waste, ordinary pumps can be employed, but if the water is recirculated and therefore contains a considerable quantity of grit and abrasive material, pumps of special construction have to be installed to withstand the severe wear and tear. Of particular value in such cases is the slurry pump made by the Pulsometer Engineering Co., Ltd., which is a special centrifugal design, the result of many years' experience in this difficult work. The casing is of close-grained iron of extra thickness and a similar iron of extra thickness is used for the impeller which runs between renewable hard iron side plates.

A leading feature of the design is the easy adjustment enabling the suction side plate to be moved towards the impeller, thereby restoring the original clearance and compensating for any wear which has taken place. This adjustment can be made from the outside of the pump, without the dismantling of any part, and enables the impeller to continue in use while at the same time maintaining the original efficiency over a long period. Generously rated ball and roller bearings support the spindle, and the whole pump is of heavy and robust construction.

Various improvements in the design of small centrifugal pumps have made it possible to use them in place of the duplex steam pump, hitherto standard practice for by-product plants. The firm has also had extensive experience with the pumping of naphthalene, tar oil, creosote, benzole, and ammoniacal liquor, lime water, solvents and wash oils, and other products.

In the treatment of naphthalene and tar oil, liquids have to be dealt with at high pressures, and these pumps are handling tar oils at temperatures up to 662°F. (350°C.). Such pumps are supplied with water-cooled stuffing boxes and bearings.—*Pulsometer Engineering Co., Ltd., Nine Elms Ironworks, Reading.*

Associated Lead

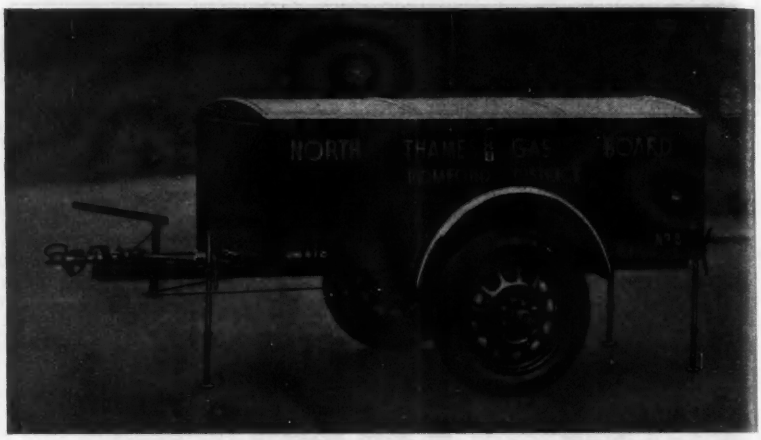
We have received their complete 'Products List.' Comprehensive and clear, it also sets out the reasons for the association in 1949 which brought together eight old-established firms. Copies are obtainable from *The Associated Lead Manufacturers, Ltd., Ibex House, The Minories, London, E.C.3.*

Crypto, Ltd.

Crypto, Ltd., have appointed J. S. Meechie, Ltd., of 10-12, Crichton Street, Dundee, to be their sole Scottish sales and service agents for the complete range of Crypto food preparing machinery and catering equipment. The Crypto showrooms and service department at 441, Eglinton Street, Glasgow, C.5, will now be under control of the new Scottish agents.

Pratt Trailer

The Pratt trailer is particularly useful for distribution department work, breakdown and emergency squads, etc. The type M.T.L., as illustrated, has a 8 cwt. capacity and is supplied to numerous gas boards. The body is 6 ft. long × 3 ft. wide × 19 in. high, and in addition the lid gives an extra 4 in. to the height in the centre. A special feature of the lid is the substantial steel tube which extends the full length of the lid on the off side, and to which are welded the hinge brackets and three steel arms, the latter being attached to the lid cross members. This method of construction together with substantial hinges and hinge stops ensures a strong and rigid lid which can be securely closed with a hasp and padlock. Dust and water excluders are also fitted to the lower edge. Full details of their various models will gladly be supplied by the makers.—*Pratt Engineering Co., Ltd., Northallerton, Yorks.*

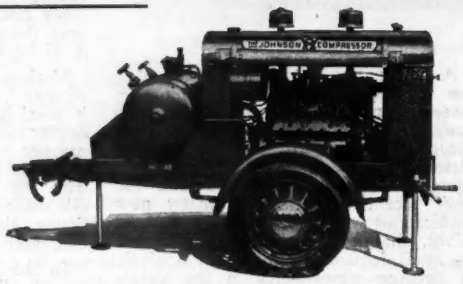


By courtesy of the North Thames Gas Board

C. H. Johnson, Ltd.

The V8 compressor provides a highly mobile machine of small overall dimensions, capable of operating one heavy or two medium breakers. This has been achieved by departing from the orthodox layout which incorporates a separate engine and compressor mounted in line and coupled together. It utilises the Ford V8 engine, one bank of which is converted into a compressor by means of a special cylinder head, valve plate and induction manifold. The other bank of four cylinders is utilised as the power bank. Thus we have a complete compressor engine unit, capable of delivering 55 cu.ft. of free air per minute, at a pressure of 100 lb. per sq. in. in the overall dimensions of the Ford V8 engine.

The unit complete with all auxiliary equipment, radiator, canopy, air receiver, and tool box, is mounted on a lightweight high speed chassis complete with tow-hitch and overrun brakes. This chassis is also of unorthodox construction in that the axle is mounted on rubber blocks in place of the usual springs. This gives the advantage of minimum sway while towing with the necessary cushioning of road shocks transmitted by the axle to the chassis. The compressor does not require any after-cooler as the air delivered by the pistons is passed through the water jacketted cylinder block before entering the receiver. Engine spares can be obtained from any Ford service depôt throughout the country.—*C. H. Johnson (Machinery) Ltd., Stockport.*



Johnson's V8 Compressor, complete with all auxiliary equipment.

Trade Publications

We acknowledge with thanks the following:—

British Ropes, Ltd., 'Rope Talks' No. 25. As interesting as ever. Contains articles on sponge fishing, the 'Kon-Tiki Expedition,' Sub Oceanic oil and many more.

Cannon Iron Foundries, Ltd., loose-leaf service manual on their cookers. Convenient for the fitter to handle, it will replace the old instruction charts. It contains all details of installation and maintenance.

Cochran & Co. Annan, Ltd., new catalogue No. 72, dealing with vertical boilers with horizontal fire-tubes. Profusely illustrated and detailed, it will prove invaluable in selection of a boiler.

De La Rue & Co., Ltd., Festival Number of their Journal. It deals with everything from canasta to gas-fired boilers in cathedrals.

General Refractories, Ltd., Publication No. 71A describing 'Amberlite' insulating bricks and Publication No. 71B describing 'Amberex' plastic insulation.

Whessoe, Ltd., new publication 'Gas Condensing and Cooling Plant,' with particular reference to the latest design of condenser. Copies are available on application.

Accurate Recording Instrument Co., Ltd.

Accurate Recording Instrument Company opened a new extension of 4,500 sq. ft. at their works in Garth Road, Morden, Surrey, on June 1. This has been rendered necessary by the rapidly increasing demand for their products both from the home and export markets.

COMPANY NEWS

ALLIED IRONFOUNDERS

The 22nd annual general meeting of Allied Ironfounders, Ltd., was held on July 19, Mr. James Shaw (chairman and managing director), presiding.

The trading profits of the group (stated the chairman) are given in the consolidated profit and loss account at £1,926,276 (last year £1,714,598). To this figure we add investment income of £64,166, an exceptional profit on the sale of investments of £10,340, profits applicable to previous years £17,364, and finally £60,000 being that part of our deferred repairs provision no longer required. Against these credit items we have to set the items of depreciation £178,011 (last year £201,250) and directors' fees and commission £39,432 (last year £35,835), leaving us with £1,860,703 before charging taxation. Taxation absorbs £1,018,003 (last year £878,414) and leaves for dividend and reserve allocations the balance of £842,700 (last year £746,510).

The directors have considered it prudent to place a further £200,000 to the reserve for replacement of fixed assets, to increase the pensions' reserve by £50,000 and to add £300,000 to the general reserve. Dividend requirements for the year, after deduction of tax, amount to £265,219, and leave a balance to be carried forward on profit and loss account of £540,882, that figure including £513,401 from last year.

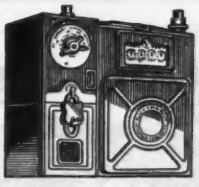
For some years now the directors have felt it incumbent upon them in the interests of the national economy to refrain from recommending any increase in the ordinary dividend, but they feel justified this year in recommending a final dividend of 11½%, making 17½% for the year.

MOMENTOUS *Measures*

AN INSPIRED MEASURE. No. 5.

Richard of the Lion Heart
with all his valiant men,
Went out to clout the wily Turk
and smite the Saracen.
"Let's go and give the blighters hades,
We'll show these cads what a Crusade is!"

Our zeal and enthusiasm for the A & M Gas Meter is no less than that of those worthy knights of long ago for their beliefs. We believe in the A & M Meter. If they went out with banners to stir their endeavours we go out with standards—high standards of quality which are our constant inspiration.



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SPECIALISTS FOR 38 YEARS IN GAS MAKING PLANT

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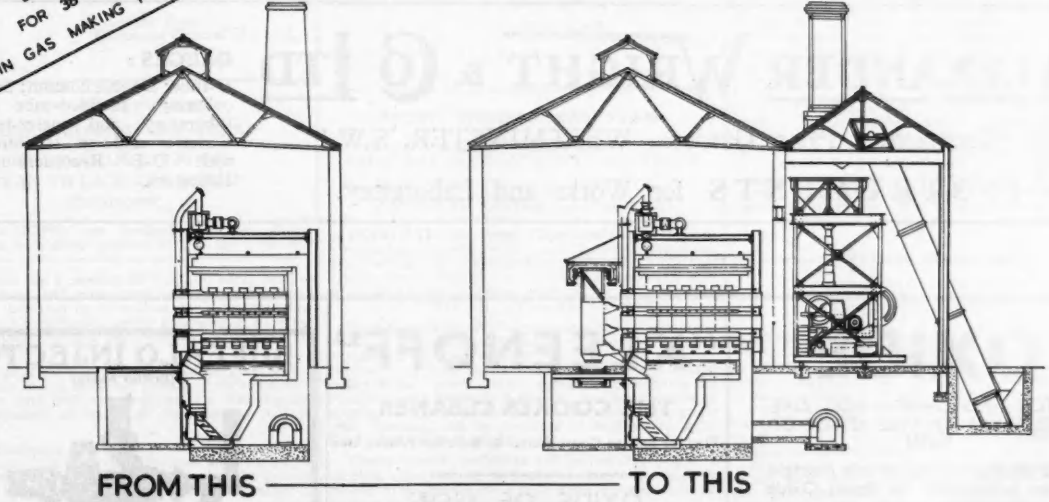

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RETORTS MADE GAS TIGHT
when patched with–
ONX SUPER 83 BRAND FIRE CEMENT
A recent testimonial from Gas Dept.
"We are pleased with results obtained after using ONX Super '83' Brand.
"Our settings were very bad, with large cracks in retorts, and portions of wall actually collapsed.
"Now, six months after repairing 28 retorts they appear as sound as ever; we anticipate the life of the settings will be prolonged."

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OVER 4000 SIZES
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FULL THICKNESS THROUGHOUT
Fit and forget!

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SPECIALLY ACTIVATED OXIDE OF IRON
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Highest prices paid for Spent Oxide.
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Tins for Sale to Consumers. In Bulk for Works Use
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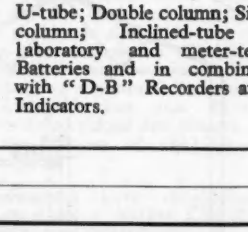
CLASS B Automatic
Operated entirely by one handle
GREEN & BOULDING, LTD.
162a, DALSTON LANE, LONDON, E.8

PUBLISHERS' NOTICE

The "Gas Journal" is published every Wednesday, price 1/-; by post 1/2d.

Subscription Rates: Home and Empire :- 52/- per annum; Foreign :- 60/- per annum. (Both payable in advance.) A copy of the "Gas Journal" Calendar & Directory is presented each year to continuous subscribers.

Classified Advertisements: All small classified advertisements are charged at 1/9 per line (approx. 7 words) - minimum charge 10/6. A Box Number address occupies 2 lines, and a further 6d. is charged towards cost of postage on replies. Copy must be received by first post on Monday to ensure insertion in that week's Journal.

Displayed Advertisements: Rates obtainable on application to the Business Manager. Change of copy for displayed spaces must be received 14 days prior to publication if proofs are required. Type area of inside pages 10" deep x 7" wide; block screen 120.

BUSINESS MANAGER: S. T. CULLEN

MIDLANDS OFFICE: 10, Union Street, Birmingham.

NORTHERN MANAGER: W. Q. Foster, 33, St. Helens Road, Harrogate. 'Phone: Harrogate 84291.

WALTER KING, LTD., 11, Bolt Court, Fleet Street, London, E.C.4.

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APPOINTMENTS VACANT

NORTHERN GAS BOARD

WORKINGTON DIVISION.

FIRST CLASS GAS FITTER required for Cockermouth Unit. Category 'B' rate of pay. Cottage available at reasonable rental. Applications giving full particulars of training and experience to Divisional General Manager, Gas Works, Workington.

NORTHERN GAS BOARD

WORKINGTON DIVISION.

TECHNICAL ASSISTANT.

APPLICATIONS are invited for the position of TECHNICAL ASSISTANT at Whitehaven Unit. Candidates must be experienced in the distribution of gas.

Salary will be within the range of Grade VI (£440 to £520) and placing within the Grade in accordance with age and experience.

The successful applicant may be required to pass a medical examination and subscribe to such scheme of superannuation as the Board may subsequently adopt.

Applications stating age, qualifications and experience together with the names of two referees should reach the undersigned not later than August 18, 1951.

J. George Pope,
Divisional General Manager.

Gas Works,
Workington.

(Amended Advertisement)

WEST MIDLANDS GAS BOARD

BIRMINGHAM DISTRICT

SWAN VILLAGE GAS WORKS.

ENGINEER.

APPLICATIONS are invited for the above position with direct responsibility to the Divisional Engineer.

The Works has a capacity of 8 million cubic feet per day of coal gas and carburetted water gas which will shortly be increased to 11 million cubic feet per day. In addition, a new Works, having a capacity of a further 11 million cubic feet per day, is under construction on an adjoining site.

The duties of the post will comprise complete supervision of the Works involving control of technical staff and labour with full responsibility for maintenance. A high standard of technical qualifications will be called for.

The commencing salary will be not less than £1,500 per annum, and the successful applicant will be required to pass a medical examination and to subscribe to such scheme of superannuation as the Board may adopt in the future.

Applications should be addressed to the Personnel and Establishment Officer, West Midlands Gas Board, 6, Augustus Road, Edgbaston, Birmingham, 15, giving full particulars of age, experience and technical qualifications, together with the names of two referees, and reach him not later than August 13, next.

Applicants are requested to quote ref. T.P.3, when replying to this advertisement.

F. H. Cureton,
Secretary.

DRAUGHTSMEN required experienced in Gasworks and By-Products Plants. Good pay for experienced men, capable of Design and Development work. Pension Scheme and Canteen facilities.

Apply, stating experience and qualifications to W. C. Holmes & Co. Ltd., Whitestone Ironworks, Huddersfield.

SOUTH WESTERN GAS BOARD

NORTHERN DIVISION.

SWINDON SUB-DIVISION.

APPOINTMENT OF CLERK-IN-CHARGE OF QUARTERLY RENTAL AND PREPAYMENT OFFICE.

APPLICATIONS are invited from experienced Rental Clerks for the above-mentioned post, at a salary within the following grade—

A.P.T. VII ... £500-£580 per annum.

Candidates must have a sound grounding in all matters appertaining to the rendering and collection of accounts and be able to take efficient charge of the Quarterly Rental and Prepayment Office under the Accountancy Assistant-in-Charge.

The successful candidate will be required to pass a Medical examination, and the appointment will be subject to the provisions of such superannuation scheme as may be adopted by the Board.

Applications giving age, experience, present appointment and salary, together with the names of two referees, should be sent to the undersigned *not later than* Monday, August 13, 1951.

James Carr,
General Manager.

Radiant House,
Bristol, 1.

SOUTH WESTERN GAS BOARD

APPOINTMENT OF
PRINCIPAL ACCOUNTANCY ASSISTANTS

NORTHERN DIVISION—BRISTOL

SOUTHERN DIVISION—TORQUAY

APPLICATIONS, from Chartered or Incorporated Accountants, are invited for the above-mentioned posts, which are tenable in the office of the Divisional Accountant at Bristol and Torquay, respectively, at a salary within the following grade—

A.P.T. XII ... £695-£820 per annum.

Candidates must have supplemented their professional training by sound commercial or Local Authority experience, and will be required to spend the greater part of their time on internal audit work and liaison duties at the various units comprising respectively the Northern and Southern halves of the Board's area of supply. They must be conversant with high grade office practice, and be prepared to deputise in Sub-Divisional offices in emergencies.

The successful candidates will be required to pass a medical examination, and the appointments will be subject to the provisions of such superannuation scheme as may be adopted by the Board.

Applications, stating clearly whether they are for the Bristol or Torquay post, or either, must give age, qualifications, experience, present appointment and salary, together with the names of two referees, and should be sent to the undersigned *not later than* Monday, August 20, 1951.

W. N. Curtis,
Secretary and Solicitor.

9a, Quiet Street,
Bath.

SOUTH WESTERN GAS BOARD

BRISTOL SUB-DIVISION.

APPOINTMENT OF
A SENIOR HOME SERVICE ADVISER.

APPLICATIONS are invited for the above position from suitably qualified persons holding a recognised Domestic Science Diploma.

Candidates must be capable of conducting Lectures, Demonstrations and Practical Classes, also of advising Consumers in their own houses in the use and care of gas equipment.

Salary Grade IX A.P.T., Provincial 'A' £456-£536 × £16.

Applications, stating age, qualifications, present position, etc., together with the names of two people to whom reference may be made should reach the undersigned not later than August 31, 1951.

Charles R. Ingham,
Manager.

South Western Gas Board,
Radiant House,
Bristol, 1.
August 2, 1951.

THE BRITISH COKE RESEARCH ASSOCIATION has vacancies for graduates in Fuel, Chemistry, Physics or Chemical Engineering for laboratory and/or plant work. (1) PRINCIPAL or SENIOR SCIENTIFIC OFFICERS as research section leaders. Good Honours degree essential, experience of research necessary and of heavy industrial plant an advantage. (2) SCIENTIFIC AND EXPERIMENTAL OFFICERS for work in laboratory or on coke ovens and iron and steel plants. Industrial experience desirable, though not essential. Successful candidates may be required to work at research centres situated in Newcastle-upon-Tyne, Sheffield, South Wales, or at the London Headquarters. The salary scales are as follows, P.S.O.: £960-£1,295, S.S.O.: £720-£910, S.O.: £380-£620, E.O.: £495-£645. (London location allowances will be payable to those seconded to Headquarters.) Participation in the Federated Superannuation Scheme for Universities is compulsory. Applications stating qualifications, experience and grade applied for should be sent to the Director, British Coke Research Association, 74, Grosvenor Street, London, W.1.

SCOTTISH GAS BOARD

SOUTH EAST DIVISION.

HAWICK SUB-GROUP.

APPLICATIONS are invited for the post of ASSISTANT MANAGER. The salary will be in accordance with Grade A.P.T. VII, Provincial 'A' (£500-£580 per annum), commencing at a figure appropriate to qualifications and experience.

Successful applicant may be required to pass a medical examination and the appointment will be subject to the provisions of such superannuation scheme as may be adopted by the Board.

Applications stating age and experience and whether or not subscriber to a superannuation scheme should give full particulars of training and qualifications. This together with the names of two referees should be addressed to the undersigned for receipt, not later than ten days after the appearance of this advertisement.

Robert Cowie,
Sub-Group Manager.

Gas Works,
Mansfield Road,
Hawick,
Roxburghshire.

(Classified advertisements continued on Supplement 4)

APPOINTMENTS VACANT (*ctd.*)

DISTRIBUTING ENGINEER required for progressive Civil Engineering Contractors, Central England, specialising in the laying, relaying and maintenance of gas supplies. Excellent opportunity for advancement for one with distribution experience and initiative—contracting experience not essential. Salary according to suitability, bonus, car or car allowance and expenses. Write in first instance giving age, details of education, training and experience, which will be treated in strict confidence, to No. 9968, *Gas Journal*, 11, Bolt Court, Fleet Street, London, E.C.4.

EAST MIDLANDS GAS BOARD

LEICESTER & NORTHANTS DIVISION.

SENIOR TECHNICAL ASSISTANT—

NORTHAMPTON UNDERTAKING.

APPLICATIONS are invited for the position of SENIOR TECHNICAL ASSISTANT at the above Undertaking. The salary will be within Grade VII of the National Salary Scales for Gas Staffs (minimum £500—maximum £580 per annum).

Preference will be given to candidates having the Higher Grade Certificate in Gas Engineering (Manufacture) of the Institution of Gas Engineers, or the equivalent. Applicants should have had experience of Continuous Vertical Retorts and be conversant with the technical control of modern Gasworks plant.

The post is superannuable and the successful candidate may be required to undergo a medical examination.

Applications stating age, and giving details of education, qualifications and experience, together with the names of two referees should be sent to the undersigned to be received not later than August 31, 1951.

C. C. WOOD,
Divisional General Manager.

Gas Offices,
Millstone Lane,
Leicester.
August 2, 1951.

EAST MIDLANDS GAS BOARD

CIVIL DEFENCE OFFICER.

APPLICATIONS are invited for the appointment of CIVIL DEFENCE OFFICER to the Board. The duties are to establish a Civil Defence organisation covering the Board's works and offices throughout the Area, which is administered through four General Managers in the following Divisions: Sheffield and Rotherham; Notts. and Derby; Leicester and Northants.; Lincolnshire.

Previous experience of the organisation of Civil Defence is essential, and experience in industrial and commercial premises would be an advantage.

The commencing salary will be within the range £750-£900 per annum, according to qualifications and experience.

Applications stating age and giving details of education, qualifications and experience, together with the names of two referees, should reach the undersigned not later than September 8, 1951.

A. GWYNNE DAVIES,
Secretary.

Beverley House,
University Road,
Leicester.
July 31, 1951.

EAST MIDLANDS GAS BOARD

TECHNICAL OFFICER.

APPLICATIONS are invited for the appointment of TECHNICAL OFFICER to the Board.

This officer will work directly under the full-time members of the Board and will be provided with a small staff.

His duties will include the co-ordination of the technical planning carried out in the four Divisional Engineering Offices.

Candidates should have had experience in the estimating of future demands for gas in large undertakings and in the design and construction of large scale gasworks and of mains and plant for the transmission of gas in bulk.

Candidates should be corporate members of the Institution of Gas Engineers and should have a sound background of scientific and engineering knowledge and experience.

The commencing salary will be not less than £2,000 per annum.

The appointment will be superannuable and the successful candidate may be required to pass a medical examination.

Applications stating age and giving details of education, qualifications and experience, together with the names of two referees, should reach the undersigned not later than September 8, 1951.

A. GWYNNE DAVIES,
Secretary.

Beverley House,
University Road,
Leicester.

NORTH WESTERN GAS BOARD

MANCHESTER GROUP.

DEPUTY GROUP DISTRIBUTING ENGINEER.

APPLICATIONS are invited for the position of DEPUTY DISTRIBUTING ENGINEER to the Manchester Group.

The salary for the position will be £1,000 per annum, and the successful applicant may be required to pass a medical examination and subscribe to such superannuation scheme as the Board may adopt.

Applicants should be experienced in all aspects of gas distribution both by high and low pressure systems, and in the supervision of new schemes and in the maintenance and operation of existing systems.

The successful applicant will be directly responsible to the Group Distributing Engineer for control and planning within the Group area, and must be capable of preparing estimates and specifications for distribution work and plant.

Applications, giving details of age, qualifications and experience, together with the names and addresses of two persons to whom reference may be made, should be forwarded to the General Manager, North Western Gas Board (Manchester Group), Town Hall, Manchester 2, so as to be received not later than twelve days after the publication of this advertisement. Envelopes should be endorsed "Deputy Group Distributing Engineer—Manchester."

NORTH WESTERN GAS BOARD

PRESTON GROUP.

DEPUTY STATION ENGINEER—

CHORLEY WORKS.

APPLICATIONS are invited from suitably qualified persons for the above appointment.

The successful applicant will be responsible to the Station Engineer for the general supervision of all the activities carried out on the Works, including the control of labour. Applicants should possess the Higher Grade Certificate (Gas Manufacture) of the Institution of Gas Engineers and have received a thorough training in all branches of gas manufacture. Experience of Glover-West Vertical Retorts and C.W.G. plants will be an advantage.

The commencing salary will be within the range of Grade A.P.T. IX of the National Salary Scales (£570-£670 per annum), according to experience and qualifications.

The successful applicant may be required to pass a medical examination and to subscribe to such scheme of superannuation as the Board may adopt.

Applications furnishing personal details, particulars of training, qualifications and experience, together with the names and addresses of two referees, should reach the General Manager, North Western Gas Board (Preston Group), 108, Fishergate, Preston, within fourteen days after the publication of this advertisement.

NORTH WESTERN GAS BOARD]

MANCHESTER GROUP.

APPLICATIONS are invited from suitably qualified persons for the post of TRANSPORT OFFICER to the Manchester Group of Undertakings.

Applicants should have received a regular training in transport management and also possess considerable experience in an executive capacity in a large transport organisation. Engineering experience and a professional qualification in engineering and/or transport would be considered an advantage.

The commencing salary will be £900 per annum, and the successful applicant may be required to pass a medical examination and subscribe to such scheme of superannuation as the Board may adopt.

Applications, giving personal details, particulars of training, qualifications and experience, together with the names and addresses of two referees should be addressed to the General Manager, North Western Gas Board (Manchester Group), Town Hall, Manchester, 2. so as to be received within fourteen days of the publication of this advertisement. Envelopes should be endorsed "Transport Officer—Manchester Group."

NORTH WESTERN GAS BOARD

MANCHESTER GROUP.

INDUSTRIAL SALES ENGINEERS.

APPLICATIONS are invited from Mechanical Engineers, Chemical Engineers or Chemists to train as INDUSTRIAL SALES ENGINEERS. The appointment will be subject to the conditions of service as agreed by the National Joint Council for Gas Staffs from time to time, and the salary range will be within A.P.T. Grade VII (£500-£580 per annum).

Applicants should possess a Higher Certificate in Mechanical Engineering, Chemistry or an equivalent qualification.

The successful applicants may be required to pass a medical examination and to subscribe to such scheme of superannuation as the Board may adopt.

Applications furnishing details of age, qualifications and experience, together with the names and addresses of two persons to whom reference may be made, should be forwarded to the General Manager, North Western Gas Board (Manchester Group), Town Hall, Manchester, 2, so as to be received within fourteen days of the publication of this advertisement. Envelopes should be endorsed "Industrial Sales Engineers."

NORTH WESTERN GAS BOARD

SOUTH LANCASHIRE GROUP.

DISTRICT DISTRIBUTING ENGINEER—

WIDNES DISTRICT.

APPLICATIONS are invited for the position of DISTRICT DISTRIBUTING ENGINEER, Widnes District.

The successful applicant will be responsible to the Group Distributing Engineer for all aspects of Distributing Engineering including the control of mainlaying and service laying staff and the supervision of mainlaying work carried out by Contractors within the above District, together with the preparation of schemes for the modification or extension of the existing mains network.

The successful candidate although posted to the Widnes district, may be called upon to serve in any district of the South Lancashire Group at the discretion of the Group Distributing Engineer.

Applicants should have had practical experience of the type of work called for, and should possess the Higher Grade Certificate (Gas Engineering—Supply) of the Institution of Gas Engineers or its equivalent.

The commencing salary will be within Grade A.P.T. VIII (£540-£620 per annum), according to experience and qualifications. The appointment will be subject to the conditions of service agreed by the National Joint Council for Gas Staffs.

The successful applicant may be required to pass a medical examination and to subscribe to such scheme of superannuation as the Board may adopt.

Applications, suitably endorsed and giving personal details, particulars of training, qualifications and experience, together with the names and addresses of two referees, should reach the General Manager, North Western Gas Board (South Lancashire Group), Radiant House, Cotham Street, St. Helens, not later than twelve days after the publication of this advertisement.

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FOR SALE: 20 **H.P. DIESEL LOCO'** 24 in. gauge. TAR STORAGE TANK (Egg Ended) 34ft. × 5ft. 6in. Sectional TANKS (Steel) 36ft. × 12ft. × 8ft. and 16ft. × 8ft. × 4ft. (C.I.) 26ft. × 20ft. × 5ft. deep. "Tangye" special STEAM PUMPS 20,000 and 30,000 g.p.h., 300ft. hd. 26 k.W. "Tangye" DIESEL GENERATING SET 220 v. D.C.

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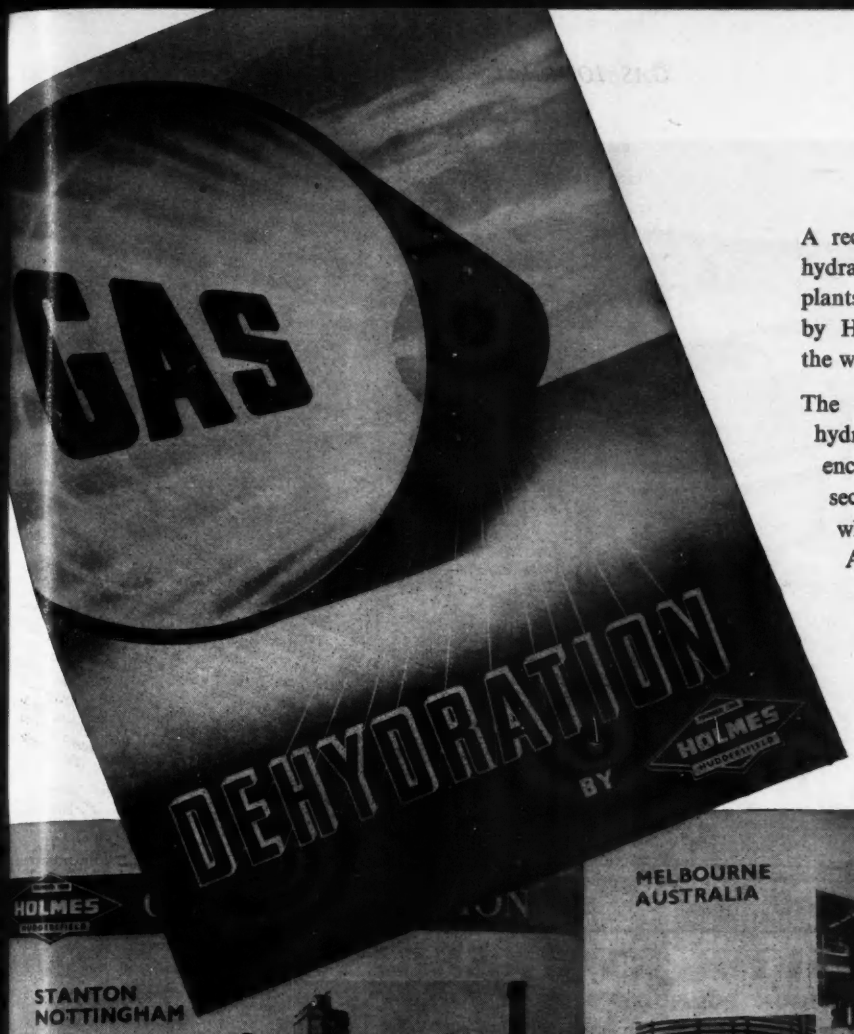

A recent publication on Gas Dehydration illustrates some of the plants designed and manufactured by Holmes, operating throughout the world.

The wide adoption of Gas Dehydration by the Industry has encouraged the printing of this second book (Brochure No. 38) which is available to Gas Authorities on Request.

HOLMES

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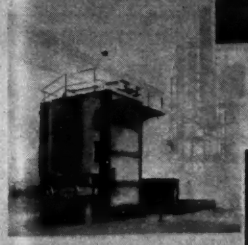
NOTTINGHAM



LEA BRIDGE
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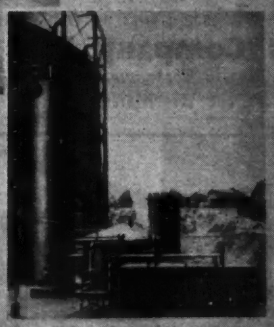

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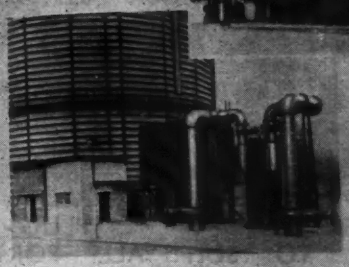

ROTHERHAM
YORKSHIRE

densation to occur in the underground pipes, while at other seasons there may be the reverse tendency, water being absorbed by the gas from the deposits which have occurred when the ground was relatively colder. These are the conditions under which dust may be produced, by the drying out of corrosion products, and surprisingly moderate gas velocities are sufficient to set up movement of the dust. Generally speaking, the gas velocities in the street mains are higher than those in the service pipes which are taken off, so that there is a tendency for dust which is on the move to be partly arrested at each individual service connection. It will also be seen that water vapour which has travelled from the works, or has been picked up en route, may again be condensed in the household pipes and fittings, and in this manner the gas meter itself may be found to suffer considerably. Whatever may be the excellence of construction of dry gas meters, and they have a high reputation for standing up to adverse conditions, the total cost of meter maintenance can be materially reduced by preventing such water condensation.

THROUGHOUT THE WORLD

W. C. **HOLMES** *& Co. Ltd.*

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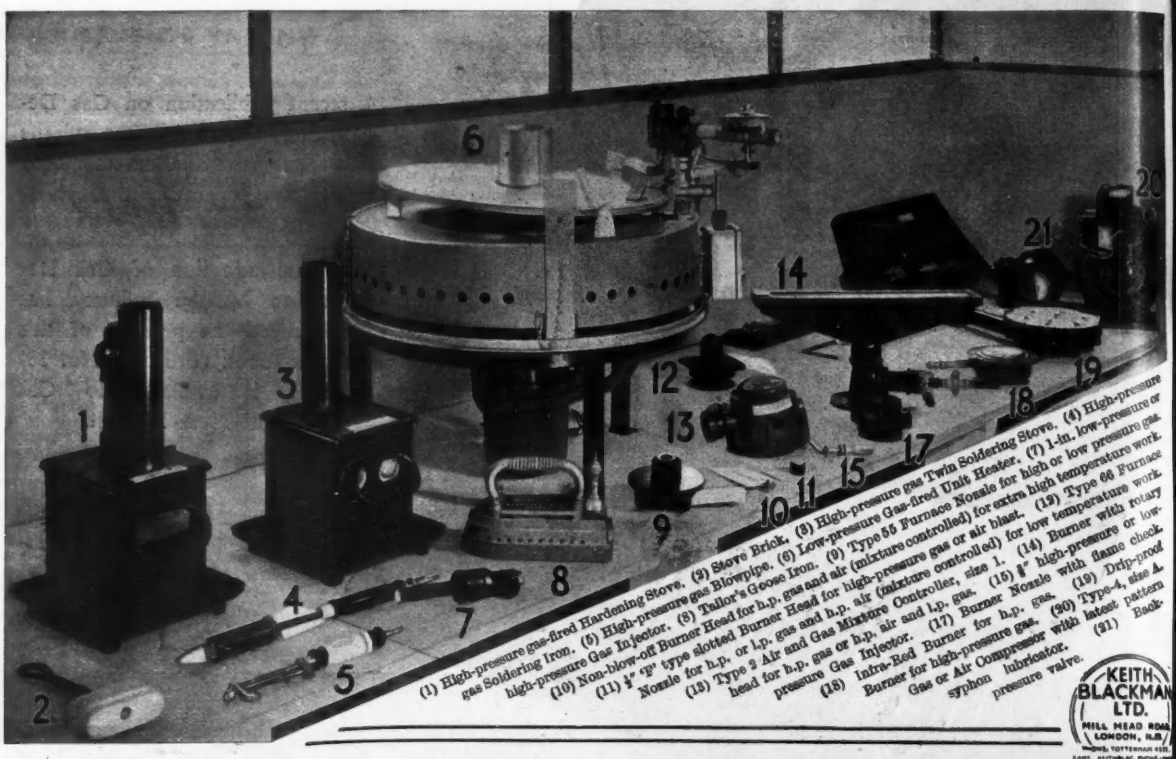

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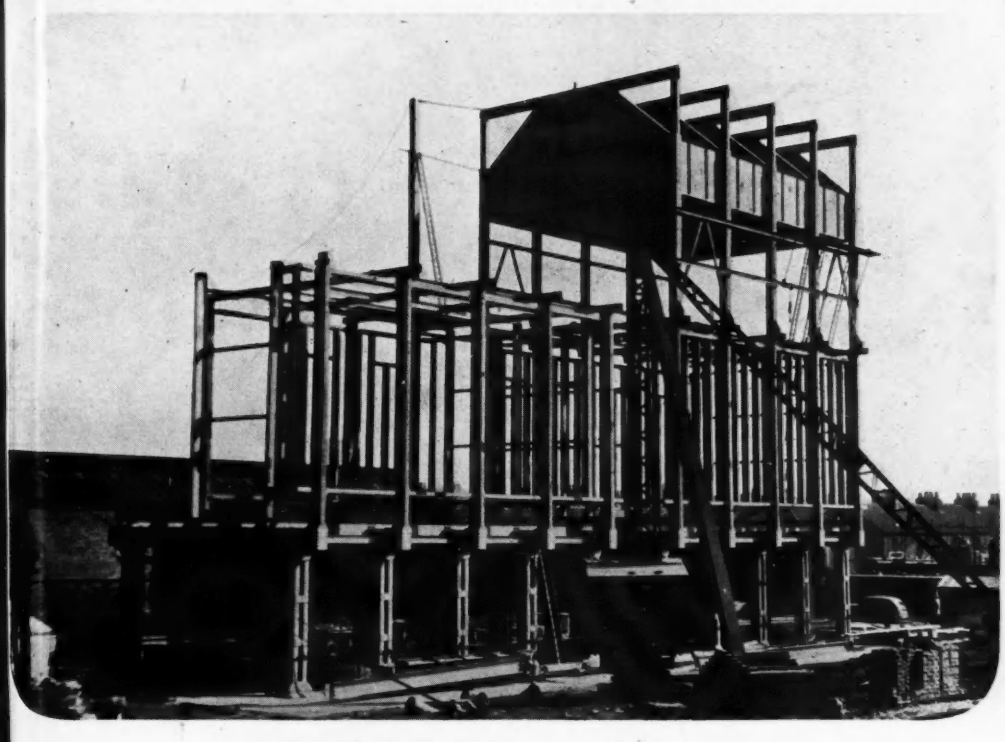
COAL AND COKE SCREENING & SIZING PLANTS.

RETORT SETTINGS PRODUCERS, FURNACES REPAIRS.

Printed by Straker Brothers Ltd., E.C.2, for Walter King, Limited, 11, Bolt Court, Fleet Street, London, E.C.4. Wednesday, August 8, 1951.

Work in progress



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Retort Benches under construction for the installation of 64, 50 inch Glover-West Vertical Retorts.

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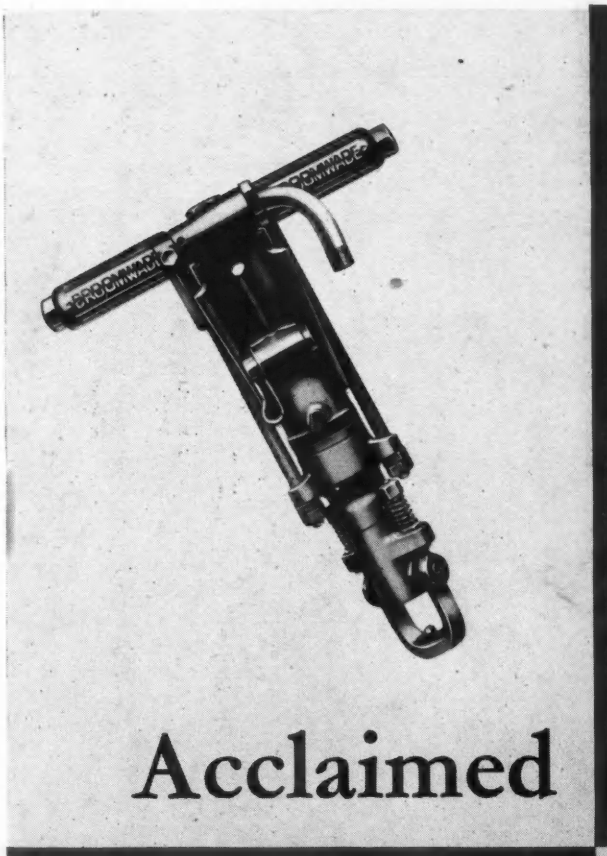

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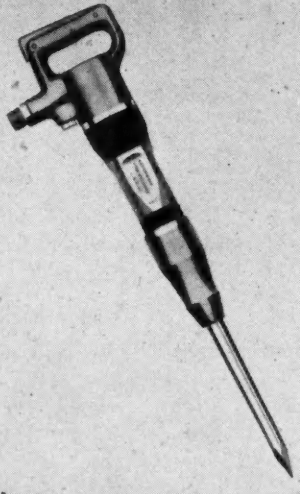

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